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LECTURES

ON

TUMOURS,

DELIVERED IN THE THEATRE OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

BY

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LECTURE I.

Classification of tumours—Their distinction from adapted hypertrophies, and from those connected with inflammatory exudations; their property of independent growing; their independence in development, maintenance, and degeneration. Relation of tumours to certain hypertrophies of organs, and especially of the thyroid and other glands: their arbitrary distinction from these. Division of tumours into innocent and malignant. Characters of malignant tumours: (a) *assumed heterology of texture;* (b) *infiltration;* (c) *proneness to ulceration;* (d) *peculiarities of the ulcer;* (e) *multiplication and reproduction;* (f) *indifference to locality. Value of each and all of these characters. Theories of the origin of tumours.*

Division of tumours generally innocent, into cysts and solid tumours; and of cysts, into simple or barren, and compound or proliferous: subordinate groups of each. Division of solid innocent tumours into fatty, fibro-cellular, fibrous, fibroid or fibro-plastic, cartilaginous, osseous, glandular, and vascular or erectile: subordinate groups of each. General distinctions of tumours and outgrowths. Objections to this method of classification: its greater advantages.

Mr. President and Gentlemen,—In the courses of lectures which I have had the honour of delivering in this College, I have endeavoured to illustrate four principal series of those specimens in the Museum which are devoted to general pathology. Following still the arrangement of the Museum, I propose now to speak of Tumours, the examples of which form one of its richest and most interesting series.

I will first, with your permission, speak of the general nature and classification of tumours—of the method by which, without pretending to the accuracy of the zoological arrangement of species, which we may seem to imitate, we may yet place these diseases in groups, and give to each group a name.

The class of diseases which includes the tumours may be reckoned as a part of the great division named Hypertrophies or Overgrowths. All its members consist in additions to the organised materials of the body, and appear to be expressions of a morbid excess of its formative force; but, in the case of each hypertrophy, the mode is peculiar in which this excess is manifested. If we compare any tumour with one of the hypertrophies that are least morbid—with one of those, for instance, in which the excessive growth is adapted to some emergency of disease, as an hypertrophy of the heart is adapted to some emergency of the circulation—we shall, I believe, always see between them this chief difference; that, to whatever extent the adapted hypertrophy may proceed, the overgrown part maintains itself in the normal type of shape and structure; while a tumour is essentially a deviation from the normal type of the body in which it grows, and, in general, the longer it exists the wider is the deviation. A striking illustration of this contrast may be found in some of the cases of fibrous tumours that grow into the cavity of the uterus.* Such a tumour may resemble in its tissues the substance of the uterus itself, having well-formed muscular and fibrous tissues; and, so far as the structures formed in excess are concerned, we might regard the tumour as the result of an hypertrophy not essentially different from that which, at the same time and rate, may take place in the uterine walls around it. But an essential difference is in this—the uterus, in its growth around the tumour, maintains a normal type, though excited to its growth, if we may so speak, by an abnormal stimulus: it exactly imitates, in vascularity and muscular development, the pregnant uterus, and may even acquire the like power; and at length, by contractions, like those of parturition, may expel the tumour, spontaneously separated. But the tumour imitates in its growth no natural shape or construction: the longer it continues the greater is its deformity. Neither may we overlook the contrast in respect of purpose, or adaptation to the general welfare of the body, which is as manifest in the increase of the uterus as it is improbable in that of the tumour.

Herein we seem to discern an essential

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* Such as (*e. g.*) No. 2682 in the College Museum. Respecting the conditions in which the changes in the uterus here described are likely to occur, see Rokitansky, Pathologische Anatomie, iii. 545.

difference between the overgrowths of tumours and those accomplished by any exercise of the normal reserve-power of nutrition in a part. This power, capable of acting in any emergency, is not a mere capacity of production, neither is it dependent upon circumstances for the fashion of its products; identical with that which actuated the germ, it is equally bound to conformity with the proper type of the part or species in which it is exercised.

An equal contrast may, in general, be drawn between the class of diseases that includes tumours, and all the others that issue in a morbid excess of nutritive formation. We may take, as the example of these, the inflammatory diseases attended with exudation, and say (reserving certain conditions*) that in these there is an excessive exercise of formative force—an hypertrophy. But between such diseases and tumours we shall rarely fail to observe the following differences:—1st. The accumulation of lymph in inflammation appears chiefly due to the morbid state of the parts at or adjacent to the seat of exudation. We have, I think, no evidence that the lymph of inflammation increases by any inherent force—any attraction of self-organising matter, or any multiplication of its own cells; but the increase of all, or nearly all, tumours, is "of themselves:" they grow as parts of the body, but by their own inherent force, and depend on the surrounding parts for little more than the supply of blood, from which they may appropriate materials. A tumour, therefore, as a general rule, increases constantly; an inflammatory exudation generally increases only so long as the disease in the adjacent parts continues.

2d. The materials severally produced in excess, in these two cases, have different capacities of development. The inflammatory exudation, in whatever part it lies, has scarcely more than the single capacity to form fibro-cellular or fibrous tissue: the material that begins or is added to a tumour may, indeed, assume either of these forms, but it may assume any one of several other forms.

But, 3dly, the most striking contrast is in the events subsequent to this first organising of the two materials. The later course of organised inflammatory exudations, like that of the organised material for repair after injuries, is usually one of constant approximation to a healthy state. As newly-formed parts, they gradually assimilate themselves to the shape and purpose, if not to the tissue, of the parts among which they lie; or they are apt to waste, degenerate, and be removed. Their progress is ever towards a better state; so that, in the whole course of exudative inflammatory diseases, some can see nothing but an "effort of nature" to avert or repair some greater evil.* It is very different with the class of diseases to which tumours belong: it is in their very nature to proceed to further and further deviation from the proper type of the body. The structure of tumours may, indeed, be like that of some of the natural parts; it may be identical with that of the part in which they lie: in this they may be homologous; but, considered in their life, they are not so; for, commonly, they are growing while the tissues far and near around them are only maintaining their integrity, or are even degenerating, or yielding themselves to the anormal growth.

I think that it is only in the consideration of this activity and partial independence of the life of tumours, and of the diseases allied to them, that we shall ever discern their true nature. We too much limit the grounds of pathology when, examining a tumour after removal, we only now compare it with the natural tissues. The knowledge of all its present properties may leave us ignorant of the property which it alone, of all the components of the body, had some time ago,—the property of growing. And so, if we can ever attain the knowledge of the origin of a tumour, it may avail little, unless it supply also the explanation of its progress. If, for example, what is very improbable could be proved—namely, that tumours have their origin in the organisation of extravasated blood, or of inflammatory exudation, still this greater problem would remain unsolved:—How or why is it, that, in ordinary cases, these materials, when organised, gradually decrease, and assimilate themselves to the adjacent parts; while, in the assumed formation of tumours, they gradually increase, and pursue, in many cases, a peculiar method of development and growth? Why is it that, assuming even a similarity of origin, the new-formed part manifests, in the one class of cases, a continuous tendency towards conformity with the type of the body—in the other, a continuous deviation from it in shape and volume, if not in texture? How is it that, to take an extreme case, we can ever find, as in a specimen† at St. George's Hospital, fatty tumours of considerable size in the mesentery of a patient from whom, in the extremest emaciation of phthisis, nearly all the natural fat was removed.

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* There are, indeed, cases in which organised lymph and scars continue to grow; but these are quite exceptional, and are to be regarded as diseases of the same class as tumours, peculiar only in respect of the materials in which they are manifested.

* Lectures on Inflammation, p. 50.

† Y 71, Museum of St. George's Hospital.

I do not pretend to answer these questions; but I think that in them is the touchstone by which we may tell the value of a pathology of this great class of diseases. It is not in the likeness or the unlikeness to the natural tissues that we can express the true nature of tumours: as dead masses, or as growths achieved, they may be called like or unlike the rest of a part; but, as things growing, they are all unlike it. It is, therefore, not enough to think of them as hypertrophies or overgrowths: they must be considered as parts overgrowing, and as overgrowing with appearance of inherent power, irrespective of the growing or maintenance of the rest of the body, discordant from its normal type, and with no seeming purpose.

To all this, I know, it may be objected that tumours, and other like growths, may cease to grow, or grow unequally, and yet are tumours still. But this is only in appearance opposed to what I have said, which is no more than that the best or only period, in which we may discern the true difference of these from other growths, is the period of their active increase. As we can have no complete idea of any living thing, unless it include the recognition of its origin, and of its passage through certain phases of development and growth; so must our thoughts of these abnormities be imperfect or untrue, unless we have regard to their development, and growth, and maintenance, as independent parts. But, indeed, the cessation of growth in tumours and the allied diseases often affords evidences of their peculiar nature, confirmatory of that deduced from their increase. Such cessation may occur when they have attained a certain regular size; as in the painful subcutaneous tumours, the osseous tumours on the phalanges of great toes, and some others, which, perhaps always, cease to grow when they have reached a limit of dimensions, that appears as natural and constant for them as the average stature is for the individuals of any species. Or, the cessation of growth may occur when the tumour degenerates or wastes; as when a fibrous tumour calcifies, or when a mammary gland tumour is absorbed. But it is to be observed that these events are, or may be, as irrespective of the nutrition of all the rest of the body as the development and growth of the tumour were; and that, except in the comparatively rare event of the absorption of a tumour, there is in no case an indication of return to the normal type or condition of the body: there is no improvement, as in the organised exudations of the inflammatory process, no adaptation to purpose, no assumption of a more natural shape. In all these events, therefore, as well as in their growth, the nearly independent nature of the tumour is shown: while forming part of the body, and borrowing from it the apparatus and the materials necessary to its life, the tumour grows, or maintains itself, or degenerates, according to peculiar laws.

The characters of which I have been speaking belong to a larger number of abnormities than are usually called tumours: they belong, indeed, to a large class, of which tumours form one part or section; and another part is composed of certain morbid enlargements of organs by what is regarded as merely hypertrophy,—such as that of the prostate, the thyroid gland, and others.* Now the distinction between these two divisions of the class must, I believe, be an arbitrary one; for the two are so little unlike, that, really, it is in these hypertrophies of glands that we may hope to find the truest guidance to an insight into the nature of tumours.

In speaking of cysts from the walls of which vascular growths may spring and fill their cavities, I shall have to describe that these intra-cystic growths are, in their best state, close imitations of the gland in which they occur. In relation to tumours, the most instructive examples of this fact are in the cystic tumours of the breast, of which the general structure has been illustrated by Dr. Hodgkin and Sir B. C. Brodie, and the microscopic character by M. Lebert and Mr. Birkett. Among these, a series of diagrams, from specimens in the Museum,† may illustrate the transition from the simple cyst to the cyst so filled with gland-substance as to form a solid tumour,—the chronic mammary, or mammary glandular tumour. Now a near parallel with the history of these mammary tumours is presented by the observations of Frerichs[*] and Rokitansky[†] on the intra-cystic growths which occur within the substance of enlarging thyroid glands,—*i. e.*, of increasing bronchoceles. In these, masses of new-formed thyroid gland-tissue are found imbedded, and inclosed in fibro-cellular coverings or capsules, within the proper, though increased, substance of the gland. In like manner, as Rokitansky has shown, it is not unusual, in enlargements of the prostate gland, to find distinct masses of new structure imitating that of the prostate, which lie imbedded and incapsuled in the proper substance of the gland. Moreover (and here is a closer contact between these hypertrophies and tumours), these growths of new gland-tissue may appear not only in the substance of the enlarging thyroid and prostate glands, but external to and detached from the glands. Such outlying masses of thyroid gland are not rare near bronchoceles;[‡] lying like the little spleens one often sees near the larger mass. Near the enlarged prostate, similar detached out-lying masses of new substance, like tumors in their shape and relations, and like prostate gland in tissue, may be sometimes found. I have here a very large and remarkable specimen of the kind, sent to me by Mr. Wyman.[§] It was taken from a man, 64 years old, who, for the last four years of his life, was unable to pass his urine without the help of the catheter. He died with bronchitis; and a tumour, measuring 2½ inches by 1½, was found, as Mr. Wyman described it, "lying loose in the bladder, only connected to it by a pedicle, moving on this like a hinge, and, when pressed forwards, obstructing the orifice of the urethra." Now, both in general aspect and in microscopic structure, this tumour is so like a portion of enlarged prostate gland, that I know no character by which to distinguish them.[||]

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* The class may seem to include, also, those abnormal states of the fœtus which are attended with excessive growth or development of organs or members, yet cannot be ascribed to a fusion of two germs; and, indeed, in the case of certain bony growths, the line cannot be drawn, without artifice, between monstrosities by excess and tumours (see Lecture vii.). But, in the large majority of cases, there are sufficient characters of distinction between them; for, 1st, the congenital excesses of development present a more complex structure, and are more conformed to the plan and construction of the body, than anything that can be reasonably called a tumour. And if it be said that this higher organization is no more than is consistent with the period of formation, which is in embryo-life, when the force of development is greatest; then, 2dly, we may note this difference—that the congenital excesses are limited for their increase to the period of natural growth of the body. They commonly cease to grow when or before the body has attained its full stature: they usually conform to its methods and times of development, growth, and decay.

† Mus. Col. Surg., Nos. 168, 169, 170, 172, &c.

The relation of these new-formed isolated portions of the thyroid or prostate gland is so intimate, on the one side, to admitted tumours,—such as the chronic mammary,—and, on the other side, to the general hypertrophies of the glands, that we cannot dissociate these diseases without great violence to nature. Clearly these are all essentially the same kind of disease: yet, to call them all "tumours" would be to do as much violence to the conventional use of terms which have become not merely the expressions, but the guides, of our thoughts. The best course seems to be to make an arbitrary division of this group. In accordance, then, with the arbitration of custom, we may assign the name of tumours to such examples of these morbid growths or growing parts, as, 1st, are isolated from the surrounding parts by distinct investing layers of tissue; or, 2dly, are continuous with the natural parts, but are abruptly circumscribed in the greater part of their extent; or, 3dly, are formed of new materials infiltrated and growing in the interstices of natural parts.

If the group of what are to be called tumours may be thus inclosed, we may next proceed to divide it into smaller parts. And, first, it seems proper to divide tumours according as they may be named innocent or malignant. I would employ these terms still, because, though not free from objections, they imply a more natural and a less untrue division than any yet invented to replace them. The distinction between innocent and malignant tumours is probably one not of mere visible structure, but of origin and of vital properties; it is, therefore, less falsely expressed by terms implying quality of nature, than by such as refer to structure alone.

I shall not be able in these lectures to describe malignant tumours. It may suffice, for the present, to illustrate those characters which may be generally deemed distinctive of malignancy; while their absence, or the existence of their opposites, may be counted among the general characters of the innocent tumours which I propose more fully to describe.

And, first, the intimate structure of malignant tumours is, usually, not like that of any of the fully developed natural parts of the body, nor like that which is formed in a natural process of repair or degeneration.

Many of the cells of cancers, for example, may be somewhat like gland-cells, or like epithelium-cells; yet a practised eye would easily distinguish them, even singly. And much more plainly their grouping distinguishes them: they are heaped together disorderly, and seldom have any lobular or laminar arrangement, such as exists in the natural glands and epithelia, or in the innocent glandular or epithelial or epidermal tumours. These innocent tumours are really imitations, so far as their structure is concerned, of the natural parts;

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[*] Ueber Gallert- oder Colloid-Geschwülste. Göttingen, 1847.

[†] Zur Anatomie des Kropfes; and Ueber die Cyste, in the Denkschr. der K. Akademie der Wissenschaften, Wien, 1849.

[‡] In the Museum of St. George's Hospital are two portions of substance exactly like thyroid gland, which were removed "from the situation" of that body.

[§] The specimen is in the Museum of St. Bartholomew's Hospital. A remarkable tumour of the same kind, but imbedded in the substance of the prostate, is in the Museum of the Middlesex Hospital.

[||] Such tumours will be further described in the last lecture.

and the existence of such imitations makes the diversity—the heterology, as it is called—of the malignant tumours appear more evident.

Still, this rule of dissimilarity of structure in malignant tumours is only general. The other properties of malignancy may be sometimes observed in tumours that have, apparently, the same structure as those that are generally innocent. I shall have to refer to cases of fibrous tumours which, in every respect of structure, were like fibrous tumours of the uterus, and yet returned after removal, and ulcerated, with infection of adjacent parts, and appeared in internal organs. These, with some others, must be regarded as malignant, though in structure resembling innocent tumours and natural tissues. On the other hand, there are some innocent cartilaginous tumours with structures that do not exist in any of our natural tissues. The two sets of cases, though both be exceptional, supply sufficient grounds for not preferring such terms as "homologous" and "heterologous" before "innocent" and "malignant," if they are meant, as they commonly are, to apply to the structure of the several growths.

Secondly, malignant growths may have the character of infiltrations,—*i e.*, their elementary structures may be inserted, infiltrated, or diffused in the interspaces and cavities of the tissues in which they lie. Thus, in its early state, a malignant tumour may comprise, with its own proper elements, those of the tissue or organ in which it is formed; and it is only in its later life that the elements of the tissue or organ disappear from it, gradually degenerating and being absorbed, or possibly yielding themselves as materials for its growth.*

Thus a hard cancer of the mammary gland includes in its mass a part, or even the whole, of the gland itself, as if there were only a conversion of the gland-tissue: and one may find within the very substance of the cancer the remains of the lactiferous tubes involved in it, and, with the microscope, may trace in it the fibro-cellular tissue that separated the gland lobes, and the degenerate elements of the epithelial contents of the tubes and acini. But among all these lie the proper cells of the cancerous growth, and these usually increase while the original structures of the gland decrease. So, too, in medullary cancerous disease of the uterus, the uterus itself, or part of it, is in the tumour, and gradually wastes while the medullary matter diffused or infiltrated in it is growing.

The malignant growths may, I say, thus appear as infiltrations; but they are not always so. Thus, though the hard cancer of the breast is, commonly or always, an infiltration of cancerous substance in and among the proper structures of the gland; yet the hard cancer of the bones is usually a distinct tumour, such as has no mixture of bone in it, but may be enucleated from the cavity or shell of bone in which it lies. So, too, while the medullary cancer of the uterus plainly consists in an infiltration or insertion of new material in the substance of the organ, that of the breast is usually a separate tumour, and altogether discontinuous from the surrounding parts.*

Many other instances of similar contrast might be cited: still the fact that their elementary structures may be thus infiltrated in the tissues they affect is a characteristic feature of malignant tumours. I think it is never imitated in cases of innocent tumours.

3d. It is, also, generally characteristic of malignant tumours that they have a peculiar tendency to ulcerate, their ulceration being commonly preceded by softening. One can, indeed, in this particular, only observe a graduated difference between the innocent and the malignant diseases; for certain innocent tumours, if they grow very rapidly, are apt very rapidly to decay; and then may suppurate and discharge their pus and débris with foul and dangerous ulceration. Thus the quickly-growing cartilaginous tumours may imitate, in these respects, malignant growths; so may large fibrous tumours when they soften and decay. Or, again, when an innocent tumour grows more rapidly than the parts over it can yield, they may waste and ulcerate, and allow it to protrude; and it may now itself ulcerate and look very like malignant disease. This may be seen in the protruding fibrous tumours that ulcerate and bleed; or, in a more striking manner, in the protruding vascular growths that have sprung up in the cystic tumours of the breast. Or, once more, the characters of readiness to ulcerate may be imitated by innocent tumours after injuries, or in exposure to continued irritation; for they resist these things with less force than the similar natural parts do. Hence, sloughing and ulcerating fibrous, erectile, and other tumours, have been often thought cancerous, and so described.

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* See, on this last-mentioned point, Rokitansky, Pathol. Anatomie, i. 122. If the removal of the original textures in such a case be quicker or more considerable than the production of the new morbid substance, there may be no swelling or visible tumour; yet, since the new material increases, the essential character of a growth is observed. Such growth without swelling is often noticed in hard cancers of the breast and of the bones.

* Nos. 2787, 2796, and others in the College Museum; and Nos. 15 in Ser. 32, and 28 in Ser. 35, of that of St. Bartholomew's, illustrate these contrasts. On the difference between *infiltrations* and *outgrowths*, see p. 9.

The respective tendencies to ulcerate can, therefore, be counted only as constituting differences of degree between the innocent and the malignant tumours. We may speak of a liability in the one case, of a proneness in the other: in the innocent, the ulceration has the marks of disease in the growth; in the malignant, it appears rather as a consequence of natural degeneration or molecular death.

4th. The softening that often precedes the ulceration of malignant growths can hardly be considered separately from the minute account of their structure. I therefore pass it by, and proceed to their fourth distinctive character, which is to be noticed in the modes of their ulceration.

This is, that the ulcer, which forms in, or succeeds, a malignant growth, has no apparent disposition to heal; but a morbid substance, like that of which the original growth was composed, forms the walls or boundaries of the ulcer; and as this substance passes through the same process of ulceration which the primary growth passed through, so the malignant ulcer spreads and makes its way through tissues of all kinds.

In contrast with this character of malignant growths, it is observable that beneath and around an ordinary ulcer of the natural tissues, or of an innocent tumour, we find the proper tissues unchanged; or, perhaps, infiltrated and succulent with recent lymph, or the materials for repair; or somewhat indurated with lymph already organised. The base and margins of a cancerous ulcer are themselves also cancerous; those of a common ulcer are infiltrated with only reparative or inflammatory material. In like manner, if ulceration extend through an innocent growth, it may destroy it all; and no similar growth will form in the adjacent parts, replacing that which has been destroyed: but, in the ulceration of cancer, while the cancerous matter is being constantly discharged, by sloughing or ulceration, from the surface, new matter of the same kind, and in more abundance, is being formed at some distance from the surface; so that, in a section through an ulcerated cancer, one does not arrive at healthy tissues till after passing through a stratum of cancer.

5th. Malignant tumours are, again, characterised by this,—that they not only enlarge, but apparently multiply or propagate themselves; so that, after one has existed for some time, or has been extirpated, others like it grow either in widening circles round its seat, or in parts more remote.

Mere multiplicity is not a distinctive character of malignant diseases; for many innocent tumours may be found in the same person. But in the conditions and circumstances of the multiplicity there are characteristic differences. Thus, when many innocent tumours exist in the same person, they are, commonly, or always, all in one tissue. Thus a man may have a hundred fatty tumours, but they shall all be in his subcutaneous fat: many fibrous tumours may exist in the same uterus, but it is so rare, that we may call it chance, if one be found in any other part in the same patient: so, many cartilaginous tumours may be in the bones of the hands and feet, but to these, or to these and the adjacent bones, they are limited.

There is no such limitation in the cases of multiplicity of malignant tumours. They tend especially to affect the lymphatics connected with the part in which they first arise; but they are not limited to these. The breast, the lymphatics, the skin and muscles, the liver, the lungs, may be all, and at once, the seats of tumours. Indeed (and here is the chief contrast), it is more common to find the many malignant tumours scattered through several organs or tissues than to find them limited to one.

Moreover, if there be a multiplicity of innocent tumours, they have generally had a contemporary origin, and all seem to make (at least for a time) a commensurate progress. But the more ordinary course of malignant tumours is, that one first appears, and then, after a clear interval of progress in it, others appear; and these are followed by others, which, with an accelerating succession, spring up in distant parts.

6th. A sixth distinctive character of malignant tumours is that, in their multiplication, as well as in their progress of ulceration, there is scarcely a tissue or an organ which they may not invade.

In regard to their multiplicity, I have just illustrated their contrast in this point with the innocent tumours; and a similar contrast is as obvious in the characters of the ulcers. It is seldom that a common ulcer extends, without sloughing, from the tissues it has first affected into any other; rather, as a new tissue is approached, it is thickened and indurated, as if to resist the progress of the ulcer. But before a cancerous ulcer the tissues in succession all give way, becoming first infiltrated, and then, layer after layer, degenerating and ulcerating away with the cancerous matter.

One may see this very well in bones. Specimens are to be found in nearly all Museums, of tibiæ (for example) on the front surfaces of which new bone is formed, in a circumscribed round or oval layer, a line or two in thickness. This bone, which is compact, hard, smooth, and closely united with the shaft beneath it, was formed under an old ulcer of the integuments of the shin. But, on the other side, specimens are found, which show that when a cancerous ulcer reaches bone, at once the bone clears away before it; and a cavity with abrupt, jagged, eaten-out edges, tells the rapid work of destruction.[*] Neither are specimens rare, showing the progressive destruction of more various tissues; such as a cancer of the scalp making way by ulceration through the pericranium, skull, and dura mater, and then penetrating deeply into the brain;[†] or one in the integuments of the shin going right through the tibia, and deep into the muscles of the calf.[‡]

Such are the general characters of malignant tumours. Those of innocent ones are their opposites or negatives. Thus: no innocent tumours have a structure widely different from that of a natural tissue; none appear as infiltrations displacing or overwhelming the original tissues of their seat; none show a natural proneness to ulceration; nor is the ulceration, which may happen in one through injury or disease, prone to extend into the adjacent parts; none appear capable of multiplying or propagating themselves in distant parts; none grow at the same time in many different tissues.

Now, the distinctive value of each of these characteristics of malignant disease may be depreciated: indeed, I have myself lowered it, by showing that each of them may be absent in tumours having all the other features of malignancy, and that certain of them may be observed occasionally in tumours that in other respects appear non-malignant. But objections against each character separated from the rest are of little weight against the total value of all these characters of malignancy, or of a majority of them, concurrent in one case. None but such as are disposed to cavil at all nosology could fail, in watching a series of cases of tumours through many years, to observe that the great majority of them could be classed according as, in their course, they did or did not present the characters that I have enumerated. Some cases would be found in which one or two of the signs might be wanting, or, if I may so speak, misplaced; but, putting these aside, as exceptions to be regulated by future inquiry, and looking broadly at the whole subject, no one could doubt that this division of tumours into innocent and malignant may be justly made, and that the outward marks by which they are discriminated are expressions of real differences in their properties and import.

In what these differences may consist, it may be best not to discuss while yet we can come to none but very vague conclusions. For malignant tumours it is, I think, most probable that they are local manifestations of some morbid state of the blood; that in them are incorporated peculiar morbid materials, which have accumulated in the blood, and which their growth may tend to increase. All their distinctive characters are, I think, consistent with this view; and if the absence of the same characters in innocent tumours may lead us to believe that they are completely local diseases, then we can, perhaps, only speak of them as the result of some inexplicable error of nutrition in the part that they affect, and as being only in the same measure dependent on the state of the blood as are the natural tissues, which require, and may be favoured by, the presence of their appropriate materials of nutrition.

It may be best to speculate no further, either on this point, or on the origin or determining causes of tumours. I could speak certainly of very little connected with these points, unless it were of the error or insufficiency of all the hypotheses concerning them that I have proposed to myself, or have read in the works of others.[*]

Narrowing, now, the objects of consideration to the innocent tumours alone, I will speak very briefly of their classification.

A first sub-division of them may be made, according to the usual arrangement, into the cysts or cystic tumours, and the solid tumours. There are, indeed, not a few instances in which the two divisions overlap or are confused. Thus, on the one side, in cases to which I have already referred, a solid growth may spring from the inner walls of a cyst, and enlarging more rapidly than the walls do, may fill the cavity, and come in contact and unite with the walls;

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[*] In the College Museum, Nos. 3082-3 3 A; 3267-8, and many others, illustrate these points.

[†] Museum of St. Bartholomew's, vi. 57.

[‡] Museum of the College of Surgeons, 232.

[*] The occurrence of tumours after injuries naturally suggests that they are due to the organization of effused blood, or of some inflammatory exudation, or of the material of repair. But there are great objections to this view. 1. It is an almost infinitely small proportion of injuries that are followed by the growth of tumours. 2. In a large majority of cases of tumour no injury or previous local disease is assigned, even by the patients, as the cause of the growth. In 100 cases, taken indiscriminately from those I have lately recorded, no local cause whatever could be assigned for the growth of 75 tumours, of which 35 were innocent and 40 malignant; of the remaining 25, referred by the patients to previous injury or disease of the part, 10 were innocent, and 15 malignant tumours. 3. Blood extravasated, and the products of the inflammatory and reparative processes, are not indifferent materials, such as would pursue this or that direction of development, according to chance, or some imaginary influence exercised on them. They have a proper tendency to assume the form of fibro-cellular, fibrous, or osseous tissue. They do not become, when their history can be traced, either fatty, or perfectly cartilaginous, or glan-

and thus may be traced a complete series of gradations from the cystic to the solid tumour. On the other hand, cysts may be formed within solid tumours, and, increasing more rapidly than the solid structure, may reduce it to scarcely more than a congeries of cysts, or to one great cyst. Such changes are illustrated sometimes in fibrous tumours of the uterus; and, I think, also, in the tumours, which Sir Astley Cooper called "hydatid disease," of the testicle.

But though there are these instances of confusion, yet the division is very convenient, and is probably deeply and well founded.

Next, among cysts, some are filled with a simple fluid, containing no organized matter, and resembling one or other of the fluids of serous cavities. These may be called simple or barren, or, in most instances, serous cysts.

Other cysts contain organised substances, and may be named, as a group, proliferous; and the several members of the group may be described, according to their contents, as glandular, cutaneous, sebaceous, epithelial, dental, and the like.

Of the solid innocent tumours, no method of arrangement at present appears reasonable but the old one, which is founded on their likeness to the natural tissues. On this ground they may be arranged in eight divisions, with names, as specific names, expressing their several resemblances,—viz., fatty, fibro-cellular, fibrous, fibroid or fibroplastic, cartilaginous, osseous, glandular, and vascular or erectile. And, again, under each of these may be arranged certain varieties, including instances that, in some uniform manner, deviate, without quite departing, from the usual characters; as the fibro-cystic, fibro-calcareous, and other varieties of the fibrous tumours.

In each assumed species or group of these solid tumours, moreover, we must make a division, according to their modes of growth, and of connection with the adjacent parts. Some among them are only intermediately connected with the adjacent parts; a layer of tissue at once separates and combines them, and, by division of this layer, such a tumour may be cleanly and alone removed from the surrounding parts: it may be enucleated or shelled-out from them. Thus, with a common fatty tumour, or a fibrous tumour of the uterus, if we cut along one part of its surface, we may, with a blunt instrument, detach the whole mass, by splitting the layer of fibro-cellular tissue which, like a capsule, incloses and isolates it.

These are what we commonly accept as the proper or typical tumours, these which are "discontinuous hypertrophies."

Other growths resemble these in every character, except in that they are connected with the adjacent parts by continuity of similar tissue, and thus appear as growths, not in, but of, the parts. Thus we cannot exactly isolate a polypus of the nose or of the uterus: the overgrown part cannot be enucleated, because the proper tissue of the nasal mucous membrane, or of the uterine wall, is continued into it; the tissue of the growth is here not only uniform, but continuous, with that of the adjacent parts. So, too, with epulis: the gum itself, or the periosteum of the jaw together with the gum, seems, by its own excessive growth, to form the tumour; and in other fibrous tumours on bones, the fibres of the periosteum appear to be in the growth, and to form part of it.

Such growths as these might be named "continuous hypertrophies," or "outgrowths;" and I will, in general, observe this distinction wherever the same tissue is, in different cases, found in both forms of growth; calling the discontinuous masses, tumours,—the continuous ones, outgrowths. Thus, answering to the common fatty tumour, we find the pendulous and continuous fatty outgrowths of the neck or the abdominal walls; answering to the fibro-cellular tumour that grows, as a discontinuous mass, in the scrotum or beneath the labia, we have the cutaneous outgrowths or enlargements of these parts; to the fibrous tumours of the uterus answer the fibrous polypi or continuous outgrowths of its substance. All these instances of clear distinction might lead us to think that a strong definition-line might be drawn to divide the whole class of innocent overgrowths into tumours and outgrowths. But when we come to the tumours of bone and periosteum, and to the erectile tumours, we find the distinctions vanishing, and in many instances no longer possible.*

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dular tissue, such as we find in tumours. 4. No intermediate conditions have been yet found between blood or lymph and a tumour. And, lastly, all the facts relating to injuries, as favouring or determining the growth of tumours, are explicable on the supposition that the injury impairs for a time the nutrition of a part, and diminishes its power of excluding abnormal methods of nutrition.

* It may seem as if these "outgrowths" needed distinction from the "infiltrations" which were spoken of as peculiar to malignant diseases. The distinctions between them are well marked. In the outgrowths the new material is like that with which it is connected, or like its normal rudiment, so that it is as if the tissue were itself outgrown; but, in the infiltration, the new material is dissimilar from that in the interstices of which it is placed. And in the outgrowth the materials of the original part appear to be at least maintained, if they are not increased; but in the infiltration they degenerate and waste We may compare, for this contrast, the cancerous diseases of the skin, and the cutaneous outgrowths of such parts as the labia or nymphæ, the prepuce or scrotum.

In thus briefly indicating that which appears still the most reasonable method of classifying tumours, I have just referred to difficulties which have appeared to some to be insuperable objections to any attempt at an arrangement of these diseases. I will therefore state, so far as I can, what is the real weight of these objections.*

First, it is said, such classifications cannot be well made, because, between each two assumed species or groups of tumours, intermediate examples may be found,—transitional, as it were, from one species to the other: the one, it is said, "runs into" the other; or, as Mr. Abernethy expressed it, "diseases resemble colours in this respect,—that a few of the primary ones only can be discriminated and expressed, whilst the intermediate shades, though distinguishable by close attention and comparative observation, do not admit of description and denomination."†

This is exactly true; but Mr. Abernethy appears to have felt that his sentence supplied the answer to the objection against classification by structure, which it expressed; for, as he did not, because of the intermediate tints, refuse to name and arrange the primary colours, so neither did he, nor need we, hesitate to name and classify diseases, and among them the principal forms of tumours.

Moreover, the objection, that structures may be found intermediate between those belonging to the chief forms of tumours, may be as well made against the use of names and systems for the natural tissues. There are no strongly outlined characters defining any of the natural tissues that are ever imitated in tumours; intermediate and confusing forms are found everywhere. The various forms of fibro-cartilage, for instance, fill up every possible gradation from cartilage to fibrous tissue: between fibro-cellular and fibrous tissues, between tendons, aponeuroses, and fasciæ, between epithelium and simple membrane, between cells and fibres, there are, in the natural tissues, the narrowest gradations. Yet we name and arrange the natural tissues with some truth and much utility; and so we may the tumours that resemble them.

Another objection against this classification of tumours is made on the ground that there are some in which two or more different tissues are mingled. Thus, tumours may be often found, in which fat and fibro-cellular tissue, or fibrous tissue and organic muscle, or cartilage and glandular tissue, or other combinations, meet together. But, among these, some are imitations of natural combinations of tissues, as the fibrous and organic muscular tissues of the uterus are imitated by the so-called fibrous tumours in its walls; and of the others, it need only be remembered that such combinations do occur, and these may be put aside from any interference with arrangement by making a series of mixed tumours, or by adding to the description of each species the combinations into which it may enter.

Yet another objection is made, that the characters of tumours are not constant, and that many must be reckoned as examples of one species, which are not much, or at all, like one another.

This diversity of characters is, indeed, the great difficulty with which the pathology of tumours has to contend; but the diversity is not to be called inconstancy: it is due to the fact that each tumour has, like each natural tissue, its phases of development, of degenerations, and of diseases. Now we have scarcely yet begun the study of the variations to which, in each of these phases, the several tumours are liable. We may have learned, for example, the general characters of cartilaginous tumours, as they grow in the most favourable conditions; but how little do we know of the various aspects these may present when they fail of due development, or fall into various diseases, or variously degenerate! Yet all these changes have to be studied in the history of every tumour; and it would be as reasonable to charge any natural tissue with inconstancy, because it is altered in development and disease, as to hold that the similar diversity of tumours is an objection to their classification according to their structure.

However, while I put this aside as an objection against classification, let me not be thought to underrate it as a difficulty; it is the great difficulty with which we have to contend. The work we have to do is not only to distinguish each kind of tumour from all other kinds, but, and in order to this end, to distinguish, as I may say, each kind from itself, by learning in each all the changes occurring in the various stages of its life. The difficulty of such a task cannot be exaggerated, while we consider the rarity of the objects to be studied; but it must be overcome before we can cease to speak of "anomalous tumours," and of "strange distempered masses," or, which is more important, before we can, even after the removal of a tumour, speak with any certainty of the issue of a case.

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* The best statement of these objections is by Vogel; but he has well answered his own arguments by disregarding them in his nomenclature of tumours.

† An Attempt to form a Classification of Tumours according to their Anatomical Structure. Surgical Works, vol. ii. ed. 1815.

LECTURE II.

Simple or barren cysts—Their general characters and varieties—Modes of origin: (a) *by expansion or enlargement of natural spaces or areolæ;* (b) *by dilatation of sacculi or parts of ducts;* (c) *by development and growth of new formed nuclei or cells. Illustrations of the third mode of origin; in cysts in the kidney. Probable deduction concerning the origin of solid tumours.*

Varieties of barren cysts:—Gaseous: Serous; in the neck, breast, gums, &c.: Synovial: Mucous; Nabothian, Cowperian, &c.: Sanguineous: Oleaginous: Colloid: Seminal.

The *Cysts*, or *Cystic Tumours*, to which I shall devote this lecture and the next, form a very numerous group, and have only or barely these characters in common—namely, that each of them is essentially a cyst, sac, or bag, filled with some substance which may be regarded as entirely, or for the most part, its product, whether as a secretion, or as an endogenous growth.

We may conveniently arrange cysts under the titles "simple" or "barren," and "compound" or "proliferous;" the former containing fluid or unorganised matter, the latter containing variously organised bodies.

Among the simple or barren cysts, of which I will speak to-day, we find some that contain a fluid like that of one of the serous membranes; such are certain mammary cysts, and those of the choroid plexus: some are full of synovia-like fluid, as the enlarged bursæ: others are full of blood, or of colloid, or some peculiar abnormal fluid: while others, forming the transition between the barren and the proliferous cysts, contain more highly organic secretions, such as milk, or mucus, or salivary or seminal fluid. These several forms we may arrange with names appropriate to their contents; as serous, synovial, mucous, sanguineous, colloid, salivary, seminal, and others.

Among the cysts, whether barren or proliferous, it is probable that at least three modes of origin may obtain. 1st. Some are formed by the enlargement and fusion of the spaces or areolæ in fibro-cellular or areolar or other tissues. In these spaces fluids collect and accumulate; the tissue becomes rarefied; and, gradually, the boundaries of the spaces are levelled down and walled-in, till a perfect sac or cyst is formed, the walls of which continue to secrete. Thus are produced the bursæ over the patella, and others; and to this we may refer, at least in some cases, the formation of cysts in tumours, and, perhaps, in other parts.

2dly. Some cysts are formed by dilatation and growth of natural ducts or sacculi; as are those sebaceous or epidermal cysts which, formed by enlarged hair-follicles, have permanent openings. Such, also, are certain cysts containing milk, that are formed of enlarged portions of lactiferous tubes; such the ovarian cysts formed by distended and overgrown Graafian vesicles; and such appear to be certain cysts formed of dilated portions of blood-vessels shut off from the main streams.

3dly. Many—and perhaps the great majority of cysts, such as those of the kidney, the choroid plexuses, the chorion, and the thyroid gland—are formed by the enormous growth of new-formed elementary structures having the characters of cells or nuclei, which pursue a morbid course from their origin, or from a very early period of their development.*

It might, on some grounds, be desirable to classify the cysts according to their respective modes of formation; separating the "secondary cysts," as those have been called which are derived by growth or expansion of normal parts, from the "primary," or, as they might be called, the "autogenous" cysts. But, at present, I believe, such a division cannot be made; for of some cysts it is impossible to say in which method they originate, and, in some instances, either method may lead to an apparently similar result. Thus, some sebaceous or epidermal cysts are clearly formed of overgrown hair-follicles; others are of distinct autogenous origin. Some ranulæ are probably formed by dilatation of the submaxillary duct, obstructed by calculi or otherwise; others by anormal development of distinct cysts, or possibly of a bursa between the muscles of the tongue.* Some cysts in the mammary gland are certainly dilated portions of ducts; others are, from their origin, anormal transformations of the elementary structures of the gland. But, in each of these cases, it may be impossible, when the cyst is fully formed, to decide what was its mode of origin—whether by growth of parts once normally formed, or by transformation of elementary and rudimental structures.

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* This third method of cyst-formation is wholly denied by Bruch (Henle and Pfeufer's Zeitschr. für rationelle Medizin, especially B. viii. p. 91). But the evidence of his papers is weak in comparison with that of the later publications by Rokitansky and Mettenheimer, and is not consistent with the cases of secreting and proliferous cysts. It is enough, however, to make one, in many cases, cautious in deciding, without special examination, whether the first or the third of the enumerated modes of formation have been observed.

Bruch refers to a paper by Engel, in the Zeitschr. der Wiener Aerzte 1846, Bd. i., which I regret to have been unable to read, but which seems, by his account, to contain much valuable information on both cysts and fibrous tumours.

Of the three modes of formation of cysts to which I have referred, the first two, namely, that which is accomplished by expansion of areolar spaces, and that by dilatation and growth of ducts or vesicles, scarcely need an explanation.†

But for the third method of formation a more detailed account is required; and this I will now endeavour to give.

The general structures of the cysts thus formed may be best studied in those that are so commonly found in the kidneys, or the mammary or thyroid gland, or in any instance of an ordinary serous cyst. Such a cyst, when large enough for naked-eye examination, is usually constructed of fine, well-formed fibro-cellular tissue, of which the filaments are commonly mingled with nuclei, or nucleus-fibres, and are variously interwoven in a single, or in many separable layers. The membranous walls thus formed are, in general, rather firmly connected with the adjacent parts, so that the cyst cannot easily be removed entire; and from these parts they derive the blood-vessels that usually ramify copiously upon them. They are usually, also, lined with epithelium, which, so far as I know, is always of the tesselated form, and may consist, according to Rokitansky, of either nuclei or nucleated cells.*

I am not aware that minute examinations have been made of the modes of earliest formation of any of the cysts of this kind, that are common subjects of surgical consideration; but there can be little doubt that, in their formation, they resemble the cysts of the kidney and other internal organs. In these organs the origin and progress of cysts have been profoundly studied by Rokitansky;† and I shall best describe them by giving an abstract of some of the observations which he has recently published. They confirm and greatly extend the results obtained by the similar investigations of Frerichs,‡ and they fully establish the accuracy of the observations on the cystic degeneration of the kidney which were made by Mr. Simon,§ to whom pathology is indebted for the first sure step in this rich path of inquiry. They may be repeated in almost any portion of a granular kidney containing cysts, or in a choroid plexus with cysts; but, I believe, the process may be best traced in the cystic disease of the embryonic chorion—the hydatid mole, as it has been called.||

In a portion of such a granular and cystic kidney, nests, as Rokitansky calls them, of delicate vesicles, from a size just visible to that of a millet-seed, may be seen imbedded in a reddish grey or whitish substance. These differ in size alone from the larger cysts to which one's attention would be sooner attracted; and, on the other side, it is simply in size that they differ from many much smaller. For if a portion of such a nest be examined with the microscope, one finds, together with the debris of the kidney, variously

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* See Fleischmann, in Schmidt's Jahrbucher, 1841, B. 32, and Frerichs, Ueber Gallert- oder Colloidgeschwülste, Göttingen, 1847, p. 37.

† Indeed, if it were not for some convenience in surgical practice, we should not retain most of the cysts thus formed in the list of tumours; for their growth appears, in most instances, to be due only to the accumulation of the contents of the obstructed tube or sacculus, being exactly adjusted to this accumulation, and commensurate with it. Thus it is in the cases of ranula with obstruction of the submaxillary duct, and the similar dilatations of the pancreatic duct; in the cystiform dilatation of the obstructed Fallopian tube; in the dilated hair-follicles; in bursæ; and in some others. These are all conventionally reckoned among cysts as arranged with tumours: but several of the like kind are never so reckoned; such as the cyst-like gall-bladder, dilated with thin mucus, when the cystic duct is completely obstructed; the dilatation of the uterus, filled with serum after closure of its external orifice; the distended sheath of a tendon; and others. Convenience and common usage have decided what cysts may be grouped with those which alone, we may anticipate, will be classed with tumours when pathology becomes more accurate and strict. Convenience alone, also, decides for the omission, from so vague a class as this, of the sacs or capsules that are formed round foreign bodies and solid tumours, and of the sacs that may be formed on the free surfaces of extravasated blood or inflammatory exudation.

* Rokitansky says (Ueber die Cyste, p. 4) there is often no epithelium in the larger cysts, and their "inner layer is a nucleated structureless or striated blastema, externally splitting into fibres in the direction of the long axis of the oval nuclei it contains." Epithelial cells, apparently altered so as to resemble very large exudation-cells, are commonly found in the tenacious contents of bursæ.

† Ueber die Cyste. Wien. 1850.

‡ Ueber Gallert- oder Colloidgeschwülste.

§ "On Subacute Inflammation of the Kidney," in the Medico-Chirurgical Transactions, vol. xxx.

|| Mettenheimer, in Müller's Archiv. 1850.

diseased it may be, a vast number of vesicles or cysts that were invisible to the naked eye. The most striking of these have a wall consisting of layers of fibres scattered over with curved nuclei, and are filled with granulated nuclei, or, more rarely, with round or polyhedral cells, some of which may contain a molecular or granular pigmental matter. In many of these cysts, the nuclei or cells are reduced to an epithelial lining of the cyst; and in some even this is absent, and the barren cyst is filled with a clear or opaline adhesive fluid.

From the size just visible to the naked eye, such cysts vary down to $\frac{1}{500}$th of an inch in diameter; and, together with these, are cysts whose walls (though their contents are like those of the others) consist of a structureless hyaline membrane: and these lie in a stroma which is equally simple, but seems to develop itself gradually into a fibrous structure circumscribing the cysts.

Moreover, one finds, in the same specimens, structures of the most various sizes, which, except in size, agree completely with the last-mentioned structureless vesicles, and show every grade of size down to that which is just larger than a nucleus. The smallest of these contain a clear fluid, or are slightly granulated: in the larger there is a central nucleus, and to this are added a second, a third, and a fourth nucleus, and so on till there appear several which fill up the commensurately enlarged vesicle. Now in such a nucleus seems to lie the nucleus of the history of development of these autogenous cysts, not in the kidney alone, but in any part in which they may occur. A nucleus grows to be a cyst, whether a simple or barren one, or one that has an endogenous production of nuclei, or cells, or any other structures. And, perhaps, in the same specimen, the earlier history of the nucleus itself may be traced; for one sees, together with the nuclei, still smaller corpuscles of all sizes, down to that of the elementary granule, so-called; and these, the larger they grow, the more are they like nuclei; so that, perhaps, the progress of the disease is from these granules, enlarging to the formation of nuclei, and thence pursuing some abnormal course.

It would be tedious now to trace, from this general sketch of their origin, all the phases through which such cysts may pass. Rokitansky has done it amply. We have here the elementary constituents. But the simple cyst-wall is capable, not only of growing, but of acquiring, by appropriation and development of surrounding blastema, the laminar and nucleated fibrous tissue, which we find in its full estate; acquiring these, we may presume, just as, more normally, the simple membranous wall of a new blood-vessel acquires, as it grows, the nuclei and fibrous tissue that belong to its more perfect state. Such might be the least abnormal course of any cyst: but from this it may deviate; thickening, acquiring continually new layers, calcifying, and in other ways showing the signs of degeneration or disease. The contents, also, of the cyst may assume even yet more various forms: to name only the extremes—they may retain the simple state of liquid; or with liquid there may be a simple, or a specially secreting, epithelial layer; or the contents may acquire the structure of well-organised glands, or cancer, or some other tissue; and between these extremes, according to conditions which we have no power to trace or explain, they may pass in any of the manifold ways of wrong, the ends of which I shall have to describe.

Important as the history of cysts may be in its direct bearings, yet these are not all that we may observe in it. In their history I cannot but think we may discern an image of the first form and early progress of many innocent solid tumours also. For, as the cyst is traced from the mere nucleus, or even from the granule, onwards to its extreme size or complexity of structure or contents, so, it is very probable, from the numerous correspondences between them, that these solid tumours also have a similar beginning in some detached element, or tissue-germ, or in some group of such germs, which, in their development and growth, may coalesce, and then may appropriate, or exclude for absorption, the intervening substance.

Thus, in the form of erring nuclei, we may, I think, almost apprehend the structural origin of these cysts and tumours: yet, if we may, the question still remains whether the elementary structures in which they begin be some new and special morbid elements, or some natural rudimental structures perverted from their normal course. Rokitansky, in his explanation of the cyst-formation, implies that the cyst is derived from a new element. Mr. Simon, speaking of the cysts of the kidney, regards them as "vesicular transformations of the ultimate structure of the gland;" and to this view, without adopting some ingenious suppositions which he has connected with it, I would adhere. For, unless a cyst or a solid tumour (assuming this mode of their origin to be correct) were really a transformation of a nucleus, or a cell, of the part in which it grows, we could not understand the very general similarity that we find, between the contents of certain cysts and the secretions or structures of the glands in or near which they occur; nor yet the likeness which commonly exists between the solid tumour and the tissue in which it is imbedded. These things are as if the first beginning of the abnormal growth were in some detached element of the natural tissue, which element, being perverted from its normal course, thenceforward multiplies and grows, conforming, in nearly all cases, with the type, in minute structure and composition, but more and more widely deviating from it in shape and size.

Such are the facts, and such the speculations that we may entertain respecting the origin, or, at least, the smallest visible beginning, of a cyst or an innocent solid tumour. Need I add that if even this be true, we are yet far from the explanation of the cardinal point in the pathology of tumours — their continual growing. Why should these detached tissue-germs, or any less minute and less isolated portion of an organ, grow while all other germs and parts that are most like them remain unchanged? I have already confessed my ignorance.

I will endeavour now to illustrate the histories of particular forms of the simple or barren cysts.

1. The first that may be enumerated are Gaseous Cysts. I know, indeed, concerning them only the specimens placed by Hunter in his museum;* but these should be admired, or almost venerated; for their histories include the honourable names of Hunter, of Jenner, and of Cavendish. Mr. Hunter says of them,—"I have a piece of the intestine of a hog, which has a number of air-bladders in it."......"It was sent to me by my friend Mr. Jenner, surgeon, at Berkley, who informed me that this appearance is found very frequently upon the intestines of hogs that are killed in the summer months."......"Mr. Cavendish was so kind as to examine a little of this air; and he found 'it contained a little fixed air, and the remainder not at all inflammable, and almost completely phlogisticated.'"†......

What a relic have we here! Surely, never, on an object so mean to common apprehensions, did such rays of intellectual light converge, as on these to which were addressed the frequent and inquiring observation of Jenner—the keen analysis by Cavendish—and the vast comparison and deep reflection of John Hunter! Surely, never were the elements of an inductive process combined in such perfection! Jenner to observe; Cavendish to analyse; Hunter to compare and to reflect!

2. The Serous Cysts are, of all the order, the most abundant. Their most frequent seats are, by a hundred-fold majority, in or near the secreting glands or membranes, or the so-called vascular glands; but there is scarcely a part in which they may not be found. Their frequency in connection with secreting structures has led some to hold that they are all examples of perverted epithelial or gland-cells; but their occurrence in such parts as bones and nerves, among deep-seated muscles, and in fibrous tumours, makes it sure that they may originate independently of gland-cells;* though why any element of a solid tissue should retain the vesicular form which it has in its germ-state, and in that form grow, we cannot tell.

Of this numerous group of serous cysts, however, I will speak at present of only such as may best illustrate their general pathology, and are of most importance in surgical practice; and I will, to these ends, refer chiefly to the cysts in the neck and in the mammary gland.

Single serous cysts in the neck form what have been called "hydroceles of the neck," and are well exemplified by a specimen in the museum.† This is a single oval cyst, with thin, flaccid, membranous walls, and even now, after shrinking, measures more than six inches in its chief diameter. It was successfully removed by Mr. Thomas Blizard from between the platysma and sterno-mastoid muscles; and a part of it is said to have passed behind the clavicle. It was filled with a clear brownish fluid.

Such cysts, but various in size and other characters, are more apt to occur in the neck than in any other part of the body. Many are single cysts like this; but others are complex, having many cavities, whether separate or communicating; and some consist of very numerous cysts,—even of hundreds, clustered in one comparatively firm mass.

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* Museum of the Coll. of Surg., No. 153-4.

† See Hunter's Works, vol. iv. p. 98, and Description of Pl. xxxvii.

* Some very interesting specimens of serous cysts in bones are in the museum of St. George's Hospital. They are described by Mr. Cæsar Hawkins, in his lectures on Tumours in the Medical Gazette, vols. xxi. xxii.; and in a Clinical Lecture in the same, vol. xxv. p. 472. There are also some remarkable specimens of cysts in the antrum, in the museum at St. Thomas's Hospital, prepared by Mr. Wm. Adams, who showed them to me.

† Mus. Coll. Surg. 146. Many well-marked examples of the disease in all its forms are recorded by Dr. O'Beirne (Dublin Jour. of Med. and Chem. Sc. vol. vi. p. 834); Mr. Lawrence (Med.-Chir. Trans. vol. xvii. p. 44); Mr. Cæsar Hawkins (Med.-Chir. Trans. vol. xxii. p. 231); Mr. Liston (Practical Surgery, p. 330, ed. 1846); and others. A monograph by Wernher (Die angeborenen Cysten-Hygrome; Giessen, 1843) is referred to by Bruch, l. c., but I have not been able to see it.

In situation, too, they are various. In some cases they lie in the front of the neck; in others, at one or both sides: they may lie by the lower jaw, over the parotid, by the clavicle, or anywhere in the mid-spaces. And in any of these situations they may extend very deeply among the constituent structures of the neck. Their date of origin is often obscure. In many—perhaps in the majority of cases — they appear to be congenital; but they may be first observed at any later period of life. Last year Mr. Lawrence removed a collection of four large cysts from over the parotid gland and mastoid region of a man, twenty-eight years old, who had observed their beginning seven years previously. Three of these were filled with serum—one with pus.

Of course, in such a variety of forms there must be more than one kind in the group of cysts that are thus, for mere convenience, placed together. The variety of origins, indeed, to which cysts in the neck may be traced, gives them peculiar interest in relation to the general pathology of cysts.

Some are evidently connected with the thyroid gland; though, being singly developed, and growing to a very large size, their relation to it may be at length obscured, and they may appear, during life, quite isolated. Such an one is here.* A woman, between twenty and thirty years old, was under Mr. Vincent's care, in St. Bartholomew's Hospital, in July 1841, with a tumour in the front of her neck as large as the head of a child two years old. The tumour contained fluid, which was twice withdrawn with a trocar. At the first time the fluid looked like serum, but coagulated spontaneously; at the second, it was mixed with blood. After the second operation the cyst inflamed and discharged grumous and sanious pus; but it also enlarged quickly, and the patient died unexpectedly, and rather suddenly, suffocated.

The preparation displays a cyst occupying nearly the whole right lobe of the thyroid gland: its walls are nearly two lines in thickness; its cavity was full of lymph, pus, and blood; and the sudden death was due to a discharge of a great part of its contents into the pharynx and larynx, through an ulcerated aperture into the former.

Besides these cysts which lie within the thyroid gland, some that lie near to it are very probably of the same nature—cysts formed in some outlying portion of the gland, such as I referred to in the last lecture. But of this mode of origin we can scarcely have a proof when the cyst is fully formed and largely grown.

Other of these cysts in the neck appear to be transformations of vascular tumours—*i. e.* of erectile vascular growths or nævi. I shall refer to this point again: it is made probable by the close connection which some of these cysts have with large, deep-seated veins; by the occasional opening of blood-vessels into their cavities; and by their sometimes distinctly forming portions of vascular nævi. Thus, a child, three and a half years old, was under Mr. Lawrence's care two years ago, in St. Bartholomew's Hospital, with a tumour covering the greater part of the left side of the neck, and the lower part of the cheek. Such a swelling had existed from birth, but it had of late enlarged very much. It was composed of a cluster of close-set cysts, containing coagulable fluid; but at its upper part a firmer portion of its mass consisted of a collection of tortuous and dilated blood-vessels, like those of a nævus. The examination made of it, by Mr. Coote,* after its removal, was such as to leave little doubt in his mind that it had origin in or with a nævus growth; and other cases, to which I shall refer in speaking of erectile tumours, have confirmed this view, especially some of those which are published by Mr. Hawkins.

But when we have separated all the serous cysts in the neck that may be referred to these two sources, there will probably still remain many that we can assign to no such mode of origin, and which at present we must class among primary or autogenous cysts, independent of any secreting structure.

Among these are some with fluid contents of peculiar viscidity—ropy, or honey-like, and deriving a peculiar aspect from including abundant crystals of cholestearine. Such contents may occur, perhaps, in any cyst in the neck or elsewhere; but they appear to be comparatively frequent at or near the front of the larynx. Here is such a cyst,† attached to the hyoid bone of a sailor, between fifty and sixty years old, in whom it had existed nearly as long as he could remember. It contained a brownish-yellow, grumous, honey-like fluid, with abundant crystals of cholestearine.

Last year Mr. Lawrence had, at St. Bartholomew's Hospital, a patient, thirty-five years old, on the left side of whose neck, directly over and closely attached to the thyro-hyoid membrane, was a smooth oval tumour, about an inch in length. He had observed a regular increase of this tumour for five or six years; but its bulk and deformity alone were inconvenient. Mr. Lawrence freely cut into it, and let out a thick honey-like fluid, in which large groups of crystals of cholestearine were visible even with the naked eye. The cyst, after the incision, suppurated, and then the wound healed, and the patient left the hospital quite well.

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* Museum of St. Bartholomew's Hospital, Ser. xxii. 16.

* Lecture, by Mr. Lawrence, in the Medical Times, November 30, 1850.

† Mus. Coll. Surg. 148. The cysts which Müller describes under the name of cholesteatoma are quite different from these, and will be noticed with the cutaneous cysts in the next lecture.

I may add that such cysts as these are not uncommon near the gums, lying usually beneath the reflection of the mucous membrane from the gum to the cheek. Their occasional large size, and their thick walls obscuring the sense of fluctuation, may make them at first look formidable. A woman, thirty-eight years old, was under my care last September, in whom, at first sight, I could not but suppose something was distending the antrum, so closely was the deformity of the face due to such diseases imitated. But the swelling was soft and elastic, and projected the thin mucous membrane of the gum of the upper jaw, like a half-empty sac. I cut into the sac, and let out nearly an ounce of turbid brownish fluid, sparkling with crystals of cholestearine. The posterior wall of the cyst rested in a deep excavation on the surface of the alveolar border of the upper jaw,—an adaptation of shape attained, I suppose, as the result of the long-continued pressure of the cyst, which had existed six years.

At nearly the same time a young man was under my care with a similar swelling of larger size, which he ascribed to an injury of the gum or alveolar border of the upper jaw only six months previously. In neither of the cases could I find any disease of the maxillary bone; but I believe it sometimes exists in intimate connection with these cysts.

In no organ is the formation of cysts more important than in the mammary gland. Every variety of them may be found here: but I will speak at present of only the serous cysts.

Some of these cysts are dilated ducts, or portions of ducts grown into the cyst-form. During lactation, cysts thus derived may be filled with milk, and may attain an enormous size, so as to hold, for example, a pint or more of milk.* In other cases they may contain the remains of milk, as fatty matter, epithelial scales, &c.; or they may be filled with transparent watery fluid, without coagulable matter;* but much more commonly they contain serous fluid, pure, or variously tinged with blood or its altered colouring matter, or with various green, or brown, or nearly black fluid.†

The complete proof of the origin of some of these cysts as dilated portions of ducts, is, that by pressure they may be emptied through the nipple, or that bristles may be passed into them from the orifices of tubes. But although these facts may be often observed, yet I agree with Mr. Birkett in thinking that the majority of cysts in the mammary gland are formed in the manner of the renal cysts, to which, indeed, they present many points of resemblance.

The most notable instances of mammary cysts are those in which the whole of the gland is found beset with them. This may occur while the proper substance of the gland appears quite healthy;‡ but I think it is more commonly concurrent with a contracted and partially indurated state of the gland,—a state which, independent of the cysts, appears similar to cirrhosis of the liver, and has, I think, been named cirrhosis of the mammary gland. Its coincidence with cysts proves its nearer relation to that shrivelled and contracted state of the granular kidney with which the renal cysts are so commonly connected; or, perhaps, more nearly to the shrivelled, indurated state of the lung that may coincide with dilatation of the bronchi.

The cysts in these cases are usually of small size, thin-walled, full of yellow, brown, green, and variously deep-coloured fluids,—fluids that are usually turbid, various in tinge and density, but not usually much denser than serum. They do not lie in groups, but are scattered through, it may be, the whole extent of the gland. Similar small cysts are sometimes found in connection with hard cancer of the breast; and in this case they have been called by Mr. Hunter and others "cancerous hydatids:" but their proper relation in such cases appears to be, not with the cancer, but with the coincidently shrivelled gland.

In this disease of the mammary gland there is no reason to believe a malignant nature, though the coincidence with cancer appears not rare. Yet the diagnosis between it and cancer is not always clear, and many breasts have been removed in this uncertainty. I saw such a case two years ago. A woman, 50 years old, had, in her left breast, just below the surface of the mammary gland, a small smooth, oval, and moveable tumour. It felt firm, but not hard; but, external to it, in a line extending towards the axilla, were two or three small round "knots," scarcely so large as peas, and quite hard. In the axilla was an enlarged gland. The breast was soft, flaccid, and pendulous. The tumour was sometimes painful, and a serous and bloody fluid often flowed from the nipple. The patient's youngest child was sixteen years old, and the tumour had been noticed six months, having arisen without evident cause. There was doubt enough about the diagnosis of this case to suggest that the tumour should first be cut into. An incision exposed the cavity of a cyst full of dark turbid greenish fluid, and near it many more cysts. Similar cysts pervaded the whole extent of the gland, and the whole breast was therefore removed. Many of the cysts communicated with lactiferous tubes, from which bristles could be passed through the nipple.*

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* See a case by M. Jobert de Lamballe, in the Medical Times, Jan. 4, 11, 1845, and a collection of cases by Mr. Birkett, in one of which ten pints of milk were evacuated (Diseases of the Breast, p. 200).

* Brodie, Lectures on Pathology and Surgery, p. 155.

† Their various contents are well shown in Cooper's Illustrations of Diseases of the Breast, pl. i.; and a full account of all the diseases of this class is given by Mr. Birkett in his work already cited.

‡ Two such cases are described by Sir B. C. Brodie—Lectures on Pathology and Surgery, p. 139.

In this case one comparatively large cyst existed, with many of much smaller size. In more usual cases one cyst has a yet greater predominance over others, or even exists alone. Sometimes, in such instances, the removal or laying open of one large cyst has been sufficient; but in some, smaller cysts neglected have enlarged, and the disease has appeared to recur.†

The single cysts of the mammary gland may become enormous. I know not what boundary may be set to their possible size; but I find one case in which nine pounds of limpid "serosity" were produced in three months, in the breast of a woman thirty years old.‡ In this case the walls of the cyst were thin, and the fluid serous; and the fact illustrates a general rule, that the cysts which contain the simplest fluids, and which have the simplest walls, are apt to grow to the largest size: thickenings of cyst walls, and, much more, their calcification,§ are here, as elsewhere, signs of degeneracy, and of loss of productive power.

It would appear as if any cyst of the mammary gland might, after some time of existence in the barren state, become prolific, and bear on its inner surface growths of glandular or other tissue. But of these proliferous cysts I will speak in the next lecture.*

3. Of SYNOVIAL CYSTS I need say very little. Under the name may be included all the anormal bursæ, or ganglions, as they are called. In these, again, two methods of formation probably obtain. Some, of which the best example is the bursa over the patella and its ligament, are merely enlargements, with various transformations, of bursæ naturally existing. Not materially different from these are the bursæ which form anew in parts subjected to occasional localised pressure, and which appear to arise, essentially, from the widening of spaces in areolar or fibro-cellular tissue, and the subsequent levelling or smoothing of the boundaries of these spaces. But others, such as the bursæ or ganglions which form about the sheaths of the tendons at the wrist, appear to be the cystic transformations of the cells inclosed in the fringe-like processes of the synovial membrane of the sheaths. The opportunities of dissecting these are rare: but I believe there is a close resemblance, in mode of formation, between them and the cysts of the choroid plexus. Rokitansky has shown that these are due to cystic growth in the villi appended to the margins of the plexus, which villi are very similar, in their constituent structures, to the processes of the synovial fringes. And the probability of similar origin is enhanced by the likeness of the contents of the cysts, in both cases, to the fluids secreted by the fringes in the normal state.

4. Under the name of MUCOUS CYSTS we may include all such as are formed in connection with simple mucous membranes, or with glandular structures which we call mucous, while we know no other or peculiar office served by their secretions.

There may be many cysts of this kind; but the best examples appear to be those that may be named *Nabothian* and *Cowperian* cysts. The former probably originate in cystic degeneration of the glands of the mucous membrane about the cervix uteri. Protruding, either alone, or with polypoid outgrowths of the mucous membrane, they are observed successively enlarging, then bursting and discharging their mucous contents, and then replaced by others following the same morbid course. Or, instead of clusters of such cysts, one alone of larger size and simpler structure may be found.[*]

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* In the Museum of the Middlesex Hospital is a breast from a woman in whom both mammary glands were thus diseased. In the College Museum, Nos. 151 and 152 best illustrate the disease.

† Sir B. C. Brodie, loc. cit. p. 146, note

‡ Case by M. Marini, cited by M. Bérard, "Diagnostic différentiel des Tumeurs du Sein," p. 86.

§ For a case in which the walls of a cyst in the breast were calcified, and crackled like those of ossified arteries, when pressed, see Bérard, loc. cit. p. 56.

* Having in view only the illustration of the more general pathology of these cysts, I have not referred to more special instances of them. Examples enough are to be found in all the works here quoted. Neither have I mentioned any analysis of the contents of serous cysts; for few have been made, and these few were made on such various materials, that no general account of them can be rendered. Several are cited in Simon's Medical Chemistry; and in Frerichs' Ueber Gallert- oder Colloid-Geschwülste, p. 7-9, &c.

The Cowperian cysts appear to be connected with the Cowper's or Duvernoy's glands in the female. Whether arising from dilatation of the duct, or from cystic transformation of the elementary structures of the gland, cannot be yet stated; but, in the exact position of the Cowper's gland, and projecting into the vagina near its orifice, a cyst is often found, of regular oval shape, thin walled, of uncertain size, but growing sometimes to the capacity of a pint. Commonly the contents of such a cyst are a colourless, pellucid, or opaline ropy fluid, like that found in the closed-up gall-bladder. But from this they often vary. I have seen the contents of such cysts like the ink of the cuttle-fish, like the fluid of melanotic tumours, and like thick turbid coffee; or, to the sight, they may exactly resemble fluid fæcal matter.[†] Moreover, these cysts are very apt to inflame and suppurate. Many abscesses projecting into the vagina have in these their origin; and the treatment these abscesses receive, by free incision, is, I believe, appropriate for the cysts under all conditions.

It is not apparent upon what the varieties in the contents of these cysts depend. The only instances that I could minutely examine were the two following. In the first, a woman, 25 years old, under the care of Dr. West, had a smooth oval swelling in the lower and fore part of the right labium, nearly an inch in diameter. This had been observed slowly increasing for six years, and had commenced three months after parturition. It was not painful. I punctured it, and let out about three drachms of pellucid fluid, like mucus, or the white of egg. The cyst had a polished white internal surface, and the fluid contained numerous corpuscles, like very large white blood-corpuscles, and like such as are commonly found in the tenacious fluid of bursæ. The cyst closed on the healing of the wound.

In the other case, the patient was 45 years old, and under the care of Mr. Stanley. The tumour was nearly regularly oval, occupying the whole length of the right labium, and obstructing the vagina. She had observed it increasing for four years: it was painless, but had been often struck. A free incision gave issue to about fourteen ounces of thick, inodorous, dark brown fluid, like turbid coffee. The walls of the cyst were about one-third of a line thick, tough, compact, and closely connected with the surrounding tissues. Mr. Abernethy Kingdon, who examined the contents, found abundant molecular matter, and granule-masses, together with groups of cells, apparently resembling epithelial cells of various sizes.

5. The SANGUINEOUS CYSTS, or cysts containing blood, are, probably, in many instances, very nearly related to the serous. Some may be explained by an accidental hæmorrhage into the cavity of a serous cyst; an event corresponding with the transformation of a common hydrocele into an hæmatocele. The contents of some of these cysts are, indeed, just like those of an hæmatocele; with fluid, and coagulated, and variously decolorized blood.[*] But some cysts appear, from their origin, to contain blood; and this blood, I think, always remains fluid till it is let out, while that which collects by hæmorrhage into a serous cyst is generally partially or wholly coagulated. Some of these cysts with blood are found in the same positions and circumstances as the serous. Thus, in the neck, a series of cases of blood-cysts might be collected, exactly corresponding with the serous cysts in that part, and, like them, probably derived from various origins, some lying in the thyroid gland, some near it, some traceable to connection with vascular nævi, some of proper origin.

Of the last class one appeared to be, which was in St. Bartholomew's Hospital several years ago, and of which a drawing, made at the time, shows the general characters. A lad, about 16 years old, was under Mr. Stanley's care, with a large, oval, and somewhat pendulous swelling in the left side of the neck, which had existed many years, and appeared merely subcutaneous. It was punctured, and about sixteen ounces of fluid blood escaped, which soon coagulated. After this the cyst closed,—a result more favourable than may generally be anticipated from such simple treatment.

In the parotid gland, also, cysts containing fluid blood have peculiar interest. Nearly two years ago I assisted Mr. Stanley in the removal of one, which lay quite within the parotid of a gentleman about

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[*] A remarkable example of a cyst thus, I suppose, originating, is in the Museum of the Middlesex Hospital.

[†] As in a case related by Mr. Cæsar Hawkins in his Lectures, MEDICAL GAZETTE, vol. 21; and in two cases by Lebert, Abhandlungen, p. 109.

[*] Such hæmorrhages are frequent in cysts of the thyroid gland (Frerichs, Rokitansky; Museum of the College of Surgeons, 1502). Thus, also, we may explain the hæmatoceles of the spermatic cord, as in Mus. Coll. Surg, 2460; and Museum St. Bartholomew's, Ser. 28, 11.

40 years old. It had been for some years increasing in size, and lay beneath some branches of the facial nerve, from which the need of separating it without injury made its removal very difficult. This, however, was accomplished, and the patient remains well.

At nearly the same time, a man, 25 years old, was under my care with a similar cyst, which had been increasing without pain for two years. It lay in the parotid, but very near its surface. I punctured it, and evacuated two or three drachms of bloody-looking fluid, with some grumous and flocculent paler substance intermingled. This fluid coagulated like blood, and contained blood corpuscles, much free granular matter, crystals of cholestearine, and what appeared to be white corpuscles of blood acquiring the character of granule-cells. The cyst filled again with similar fluid after being thus evacuated: I therefore dissected it from the parotid gland, and the patient recovered.

Occasionally, one meets with sanguineous cysts, which derive a peculiar aspect from a columnar or fasciculated structure of their interior, making them look like the right auricle of a heart. This was singularly the case in one which I assisted Mr. Macilwain to remove from over the lower angle of the scapula of a lad 15 years old. It had existed more than eight years, and grew rapidly while, in the last year, he was actively at work. It was now also painful. It felt like a fatty tumour; but proved to be a cyst thus fasciculated like an auricle, with a finely polished internal surface, and containing about an ounce and a half of liquid blood. Its walls were from one to two lines in thickness, and seemed in great part made up of small cells, such as one sees in a bronchocele, full of serous and bloody-looking fluids. No trouble followed the operation; and the patient was well for at least seven years after it.*

A cyst presenting the same peculiarity of internal surface was removed by Mr. Stanley, in October 1848, from over the pubes of a boy 13 years old. It was observed increasing for nine months, and part of it, consisting of a simple thin-walled serous cyst, was transparent: but behind, and projecting into this, was a more thickly walled cyst, containing about a drachm of dark liquid blood, and on its surface fasciculate and polished like an auricle. Its walls were well defined, formed of fibro-cellular tissue imperfectly filamentous and nucleated; and I could find no epithelium ining in it. The operation was successful.

It is not improbable, I think, that both these cases may have had their origin in vascular nævi, like other cysts containing blood, to which I shall refer in speaking of erectile tumours. I will now only refer to certain cysts which, without any erectile formation, appear to be derived from portions of veins dilated, and thus obstructed and shut-off from the stream of blood. Such an one was removed by Mr. Lloyd, many years ago, from a man's thigh. It lay in the course of the saphena vein; but neither that, nor any other considerable vein, was divided in the operation, or could be traced into the cyst. This cyst* was of spherical form, about an inch and a half in diameter, closed on all sides; its walls were tough, and polished on their inner surface; it was full of dark fluid blood, and its venous character was manifested by two valves, like those of veins, placed on its inner surface. On one of these a soft lobed mass, like an intra-cystic growth, is seated.†

6. CYSTS containing OIL or fatty matter, without any more highly organized substance, are very rare. Many contain fatty matters mingled with serous, epithelial, and other substances; but in these the fatty constituent is probably the result of the degeneration of the other contents. Some, however, appear to contain fatty matter alone. Mr. Hunter preserved a specimen‡ of what he marked as "oil from an adipose encysted tumour." It was taken, I believe, from a cyst that grew "between the bony orbit and the upper eyelid" of a young gentleman. When recent, it was described as "pure oil, perfectly clear and sweet, which burnt with a very clear light, and did not mix with aqueous fluids, and, when exposed to cold, became as solid as the human fat."

Lately Mr. Wormald removed a small cyst from a woman's breast, the contents of which appeared to be pure oily matter, that congealed into a substance like lard, and contained crystals of margarine, but no organized corpuscles.

7. COLLOID CYSTS are at present a very ill-defined group; the term "colloid" being used by Frerichs,§ and other recent German writers, for all those morbid materials that are pellucid, jelly-like, flickering, half-solid, or more or less closely resembling the material found in gelatiniform, alveolar, or colloid cancer. Such a material is common

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* The cyst is in the Museum of St. Bartholomew's, ser. xxxv. 38.

* Museum of St. Bartholomew's Hospital, Appendix 10.

† In the Museum of King's College is a large cyst removed from a thigh, into which it is said the saphena vein opened.

‡ Mus. Col. Surg., 181, Pathological Catalogue, vol. iv. p. 177.

§ Ueber Gallert- oder Colloidgeschwülste.

in the cysts of bronchoceles, and in those of the kidneys, especially, I think, in those which are not associated with contraction of the renal substance, and which Baillie, and other writers of his time, described as hydatid disease of the kidney.

The contents of these cysts may present the most diverse conditions; may be of all densities, from that of dilute serum to that of a firm jelly; may range between pellucidity and the thickest turbidness; may be of all hues of yellow, olive-green, orange, brown, pink, and nearly black. The thick and pellucid contents of such renal cysts are enumerated as examples of colloid matter,—so are the contents of ranulæ, and of many bursæ; but the type is the material of the so-called colloid cancer. This, however, is beyond the range of the present course of lectures; and I shall pass by it, referring to the already cited works of Frerichs and Rokitansky, and to that of Bruch,* for the best information yet supplied.

8. The last group of cysts of which I shall now speak includes such as contain secreted fluids, like those of the glands, by the dilated ducts or transformed elements of which they are formed. Such are the cysts in the breast that contain milk, and probably many instances of ranula. The origin of the former is, probably, in dilatation of lactiferous ducts; that of the latter is uncertain. But the examples of this group, of which I wish more particularly to speak, are the seminal cysts, including under this name those that are usually called encysted hydroceles, or hydroceles of the spermatic cord. Their various forms are fully described by Mr. Curling,† and are well illustrated by specimens in the Museum of the College.‡ They are usually thin-walled spherical or oval cysts, imbedded in, and loosely connected with, the tissue of the cord. Their most frequent seat is just above the epididymis, but they may be found in any part of the spermatic cord. Their walls are formed of fibro-cellular tissue, and they may be lined with delicate tesselated epithelium. Their contents are usually a colourless slightly opaline fluid, like water with which a little milk has been mingled.

The discovery was made at the same time and independently by Mr. Lloyd and Mr. Liston,§ that the fluid obtained from these cysts usually contains the seminal filaments or spermatozoa. Repeated observations have confirmed their discovery; and both the existence of these bodies, and the usual characters of the fluid, just fy the speaking of it as a diluted or imperfect seminal fluid, and, therefore, of the cysts as "seminal cysts."

It was my lot, I believe, first to dissect some of these cysts;* and I found that they had no open communication or other connection with any part of the secretory apparatus of the testicle, and that their relation to the epididymis, on which they lay, was such as to forbid the supposition of the seminal secretion being transmitted to them from the tubes. I suggested, therefore, that these cysts were formed quite independently of the tubes; and that, being seated near the organ that naturally secretes the semen, they possessed a power of secreting a similar fluid; just as cysts beneath the hairy parts of the body may produce hair and epidermis, and the ordinary products of the skin. The explanation was, I believe, deemed unsatisfactory; but it is supported by the later investigations of other cysts, especially of those to which I have already referred, growing in the thyroid and mammary glands. While we find that perfect gland-substance may grow from the walls of these, it cannot seem singular if, in a cyst lying near the testicle or its duct, materials like the secretion of the testicle should be formed. The growth and nutrition of gland-tissue, and the formation of gland-secretion, are so nearly parallel processes, that the proof of the former occurring in one group of cysts removes all improbability from the belief that the latter may occur in another group.

If, then, we may regard these seminal cysts as autogenous, and may arrange them with those of the kidney and other glands, which are derived from the transformation and over-growth of isolated nuclei or cells, they may supply some facts of interest to the general pathology of cysts. Especially we may observe that in different specimens of these "hydroceles of the cord," or in the same at different times, the contents may be either a seminal fluid or an ordinary serous fluid. In one of the cases in which I dissected a seminal cyst, there existed, besides that which contained seminal fluid, another larger cyst, above and separate from the testicle and tunica vaginalis; but this contained only serous fluid like that of a common hydrocele. Now this diversity is common among cysts. Those in the kidney may contain the materials of urine, but they more commonly do not; those of the lactiferous tubes may contain either milk or some form of serous fluid; ovarian cysts may at one period produce hair and the other growths and secretions from skin, and then, casting off these, they may produce only serous or some other fluid.

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* Ueber Carcinoma alveolare und den alveolären Gewebstypus; in Henle and Pfeufer's Zeitschrift, vii. 357, 1849.

† Treatise on Diseases of the Testis, &c.

‡ Especially Nos. 2456 to 2459.

§ Medico-Chirurgical Trans., vol. xxvii. pp. 216 and 368. See, also, a paper by Mr. Curling, in the Monthly Journal of Med. Science, x. p. 1023.

* Medico-Chirurgical Transactions, vol. xxvii. p. 398.

In different cysts this diversity of contents may sometimes depend on difference of origin or of early construction. But when it happens in different periods of the same cyst, it illustrates the general rule that, in the course of time, cysts are apt to degenerate, and to produce less and less highly organized substances or secretions. This degeneration does not take place in any certain time; but generally the larger a cyst grows the less organized are its products; as if nearly all the formative force were expended in growth, and little remained available for secretion. Generally, also, the longer a cyst has lived the less organized are its products. However, these rules are only general; and I met with a remarkable exception to them, last year, in a seminal cyst which had existed for many years in a man more than 70 years old. I withdrew from it eighteen ounces of fluid, laden with seminal filaments, and no fresh accumulation took place.

I have spoken of these seminal cysts as separate from the testicle and tunica vaginalis. Mr. Lloyd believed that in some cases he had obtained fluid containing the spermatozoa from hydroceles of the tunica vaginalis; and his belief has been lately confirmed by the examination of a case after death. The specimen which, through his kindness, I am able to show, presents the ordinary appearances of a common hydrocele, except that the inner surface of the tunica vaginalis is uneven with a few small depressions or pouches from it. This hydrocele had been repeatedly tapped; the fluid had always the ordinary serous appearance of that of common hydrocele; but it always contained abundant seminal filaments. Can we suppose, then, that the tunica vaginalis has the power of secreting seminal fluid? or, were there in this case minute secreting cysts which, by dehiscence, discharged their seminal fluid into the cavity of the tunica vaginalis, as sometimes ovarian cysts by spontaneous openings discharge their contents into one another, or into the cavity of a parent cyst? I am disposed to think this latter explanation the more probable; but as yet the facts are too few to justify any conclusion.

LECTURE III.

Compound or proliferous cysts—Their distinction from clustered cysts—Modes of origin. 1. Cysts, having cysts developed in or upon their walls: exemplified in the proliferous ovarian cysts, and the cystic disease of the chorion. 2. Cysts, having glandular or other vascular growths springing from their walls; as exemplified in the "serocystic sarcomata" of the breast, the lip, and other parts. 3. Cysts, with cancerous growths from their walls. 4. Cutaneous cysts, in the ovary, brow, lung, &c. — Sebaceous and epidermal cysts—Cholesteatoma. 5. Cysts with teeth, in the ovary and the jaw.

In the last lecture I traced and illustrated the formation of simple or barren cysts,—the cysts that have only liquid contents. Among these, the instances of the highest productive power appear to be in the cysts that secrete a seminal fluid, and those that are lined with a complete secreting epithelium. In the present lecture, I propose to describe the cysts that have the power of producing more highly organized, and even vascular, structures; or, as they may be generally named, proliferous cysts.*

These include such as are often called "compound cysts," or "compound cystoid growths;" but I would avoid these terms, because they do not suggest the difference between the cysts with endogenous growths and those that may appear equally compound, though they are only simple cysts clustered or grouped together. This difference should be clearly marked in names, for it generally is so in nature. In an ovary, for example, it is not unfrequent to find many small cysts, formed, apparently, by the coincident enlargement of separate Graafian vesicles. These lie close and mutually compressed; and, as they all enlarge together, and, by the wasting of their partition-walls, come into communication, they may at length look like a single many-chambered cyst, having its one proper wall formed by the extended fibrous covering of the ovary. Many multilocular cysts, as they are named, are only groups of close-packed single cysts; though, when examined in late periods of their growth—and especially when one of the group of cysts enlarges much more than the rest—it may be difficult to distinguish them from some of the proliferous cysts.

Of the first formation of cysts that may be proliferous I need not speak; for, as far as is at present known, they may be formed exactly as the barren cysts are. A cyst may be proliferous in whichever of the plans described in the last lecture it may have had its origin. Thus, 1, bursæ, formed by expansion and rarefying of areolar spaces, may be found with organized, pendulous, or loose growths from their walls.* 2. Among the cysts formed by growth of natural cavities or obstructed ducts, we have instances of surpassing proliferous power in the ovarian cysts from Graafian vesicles, and of less power in some cases of dilated lactiferous tubes and dilated veins.† And 3. Among the autogenous cysts we find, in the breast and other glands, some of the principal examples from which the following history of proliferous cysts will be derived.

The account given in the last lecture of the modes of origin of barren cysts may therefore, so far as the cyst is concerned, suffice for the proliferous; and I shall now need to speak of only the intra-cystic productions, the differences of which may decide the grouping of the whole division of proliferous cysts.

1. The first group includes the cysts which have others growing in or upon their walls. Of these, two chief examples are presented, in the complex ovarian cysts, and in the cystic disease of the chorion or "hydatid mole."

The principal varieties of the complex ovarian cysts have been described to the very life by Dr. Hodgkin, to whom we are indebted for the first knowledge of their true pathology. But, since his minute description of them is or should be well known, I will more briefly say that, according to his arrangement, we may find in these proliferous ovarian cysts two principal or extreme forms of endogenous cysts; namely, those that are broad-based and spheroidal, imitating more or less the characters of the parent cyst, and those that are slender, pedunculated, clustered, and thin-walled. Between these forms, indeed, many transitional and many mixed forms may be found; yet it is convenient to distinguish the two extremes.

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* Under this name are here included the serocystic sarcomata of Sir B. C. Brodie (Lectures on Pathology and Surgery); most of the specimens of Cysto-sarcoma phyllodes and proliferum of Müller (on Cancer); and most of the tuberous cystic tumours of Mr. Cæsar Hawkins (MEDICAL GAZETTE, vol. xxi. p. 951).

* Museum Coll. Surg., 367, &c. See, also, a case by Mr. Cæsar Hawkins (MEDICAL GAZETTE, vol. xxi. p. 951). Perhaps, also, the case may be here referred to in which Mr. Hunter found loose bodies in a cavity formed round the ends of the bones in an ununited fracture. Museum Coll. Surg., No. 469, 470.

† Museum of St. Bartholomew's Hospital, Appendix 10; and see last lecture.

A typical example of the first is in No. 166 in the College-Museum. It is an Hunterian specimen; and the mode of preparation shows that Mr. Hunter had clearly apprehended the peculiarities of its structure. It is a large cyst, with tough, compact, and laminated walls, polished on both their surfaces. On its inner surface there project, with broad bases, many smaller cysts, of various sizes, and variously grouped and accumulated. These nearly fill the cavity of the parent cyst; many of them are globular; many deviate from the globular form through mutual compression; and within many of them are similar but more thinly walled cysts of a third order.

Here the endogenous cysts, projecting inwards, appear to have nearly filled the cavity of the principal or parent cyst; and this filling-up is complete in another specimen,* in which there remains, in the middle of the parent-cyst, only a narrow space, bounded by the endogenous cysts converging in their growth from all parts of the parent walls.

For a typical example of the slender, thin-walled, pedunculated, and clustered form of endogenous cysts, I may adduce a specimen from the museum of St. Bartholomew's Hospital.† It shows part of the thick laminated wall of an ovarian cyst, the inner surface of which is thickly covered with crowds of pyriform and leaf-like pellucid vesicles, heaped together, and one above another. This is a comparatively simple speeimen of the kind: in the more complex, the endogenous cysts or vesicles are multiplied a thousand-fold, and clustered in large lobed and warty-looking masses that nearly fill the cavity of the cyst. Specimens of this kind are among the most valuable possessions of the museum of Guy's Hospital.

The College-Museum furnishes specimens of the forms intermediate between these extremes,‡ in which the endogenous cysts of the second and third orders have walls that are not pellucid, yet are thin and vascular, and are attached by pedicles rather than by broad bases. And, again, specimens of mixed forms are found,§ in which the parent cyst-wall bears, at one part, oval and spherical membranous cysts developed beneath its lining membrane, which they raise in low convex projections into its cavity; and at another part, groups of small leaf-like, narrowly pedunculated, and pendulous cysts.

But a lecture would not suffice to describe, even briefly, the variety of forms into which these ovarian proliferous cysts may deviate. Whether we regard their walls, the arrangement and shape of the endogenous cysts, their seats and modes of origin, their various contents, and the yet greater differences engendered by disease, they are so multiform that even imagination could hardly pass the boundaries of their diversity. It must suffice to refer to Dr. Hodgkin's works for an elabarate account of the structure and arrangement of the cysts; and to the essays of Dr. Tilt* for descriptions of their contents.

The foregoing account of the structure of these cyst-bearing cysts in the ovaries is derived entirely from naked eye observations. Respecting the mode of generation of the endogenous cysts, it could only be supposed that they are derived from germs developed in the parent cyst-walls, and thence, as they grow into secondary cysts, projecting into the parent-cavity; or disparting the mid-layers of the walls, and remaining quite enclosed between them; or more rarely growing outwards, and projecting into the cavity of the peritoneum.†

But a more complete illustration of the origin of such secondary cysts, and a good confirmation of what I have been describing, may be drawn from Dr. Mettenheimer's lately published investigations on the microscopic structure of the cystic disease of the chorion.‡

The general characters of this disease, constituting the hydatid mole, are well known. A part, or even the whole, of the chorion is covered with pellucid vesicles with limpid contents, borne on long, slender, and often branching pedicles. The cysts are usually oval or pyriform; their walls are clear, or have minute opaque dots; they may either be simple or may bear others projecting from their walls.

Dr. Mettenheimer has found that the minute dots besetting these cysts are villous processes, exactly resembling those of the natural chorion, and growing from the walls of the cysts, either outwardly or into their cavities. In these villi he traced the development of cysts. In their natural state, they may be described as filiform or clavate processes, often branching and bearing bud-like projections, and composed of dimly-granular substance, in which are imbedded minute nucleated cells. In this cystic disease, vesicular bodies may be seen scattered among the cells in the villi, which bodies are distinguished from the cells by their pellucidity, their larger size, and double contours; but, from the cells to these, every gradation may be so traced as to leave scarcely a doubt that the vesicles are derived from cells deviating from their normal characters. Thus in some of the cells the contents are seen lighter and less granular; in some they have entirely disappeared, without increase of size; and then, when their contents are thus become uniformly pellucid, and they have acquired the character of vesicles, the cells appear to grow, while their walls become stronger, and they acquire such a size that they are recognised as very small cysts, similar, in all but their size, to those which are visible to the naked eye.

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* Mus. Coll. Surg., No. 2622.

† Series xxxi. 18.

‡ Nos. 165 A, and 165 B.

§ No. 2621.

* Lancet, 1849.

† No. 2622 in the College-Museum presents an instance of the endogenous and exogenous modes of growth in the same specimen.

‡ Müller's Archiv, 1850, H. v. p. 417. His account, though different in interpretation, is consistent, as to facts, with one by Gierse and H. Meckel in the Verhandl. der Gesellsch. für Geburtshülfe in Berlin, 1847.

Now, though this formation of cysts has been traced by Mettenheimer only in the villi which grow on the cysts themselves, and therefore, so to speak, only in the production of the cysts of the second and later generations, yet there can be little doubt that the first cysts in the diseased chorion are formed in its own villi after the same manner. For the villi borne on the cysts are, in all essential characters, like those natural to the chorion; and the cysts of all generations are equally like. The whole process may, therefore, be probably thus described:—Certain of the cells in the proper villi of the chorion, deviating from their cell-form, and increasing disproportionately in size, form cysts, which remain connected by the gradually elongated and hypertrophied tissue of the villi. "On the outer surface of the new-formed cysts, each of which would, as it were, repeat the chorion and surpass its powers, a new vegetation of villi sprouts out, of the same structure as the proper villi of the chorion. In these begins again a similar development of cysts; and so on *ad infinitum*." Each cyst, as it enlarges, seems to lead to the wasting of the cells around it; and then, moving away from the villus in which it was formed, it draws out the base of the villus, which strengthens itself, and forms the pedicle on which the cyst remains suspended.

Such is the account of the minute structure and formation of the cystic disease of the chorion; and perhaps no instance could afford a better confirmation of the production of cysts by the enormous growth of elementary cells, or a better type of the capacity of cysts thus formed to produce structures resembling those in the abnormities of which themselves originated. A similar capacity is among the characters of all the cysts of which I shall next have to speak.

2. I pass now to the consideration of the cysts that are proliferous with vascular growths from their internal surfaces.*

The first group of them may include those that bear glandular growths—the "glandular proliferous cysts," as we may call them, because the minute structure of the substance growing into them is, in its perfect state, exactly comparable with that of a secreting or vascular gland.

Such cysts form part of the group to which the name of "sero-cystic sarcoma" was given by Sir B. C. Brodie, who first clearly distinguished them.† They are also part of those which furnished to Dr. Hodgkin the chief grounds for his well-known theory of the formation of solid tumours—a theory which, in regard to at least these growths, has good foundation.

The chief seats of the formation of glandular proliferous cysts are the mammary and thyroid glands. Their history in the thyroid, in which their formation scarcely passes the bounds of health, is amply illustrated in the often cited works of Frerichs and Rokitansky, to which, as well as to the paper by Mr. Simon‡ on the natural structure of the gland, I must, for brevity's sake, refer.

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* It may be well to refer to the fact that abnormal growths upon natural free surfaces commonly affect the same forms as will be described in the following account of the growths in cysts. The chief forms are three—namely, 1st, that of groups of slender, small, and pedunculated bodies; 2d, that of larger round pendulous masses; 3d, that of nearly level, slightly elevated layers, such as granulations. Thus, for groups of pedunculated leaf-like processes, we have (*a*) the growths that are so frequent in chronic rheumatic diseases of joints, from some of which Müller draws his account of *lipoma arborescens*; (*b*) many warty cancerous growths on the skin, which appear like cancerous overgrowths of the papillæ; (*c*) similar growths in the larynx about the vocal cords. Of the larger round, pedunculated masses, growing on free surfaces, instances exist in the medullary cancers of the urinary bladder, the polypi of the intestines and stomach, the pendulous outgrowths of the skin. And of the flatter, and more nearly level layers, the condylomatous outgrowths of skin, the epithelial cancers of the stomach and intestines, and the cheloid growths, often afford examples. However, there is no more in this resemblance than another instance of the tendency of the growths in cysts to imitate those on natural parts.

† The disease is admirably illustrated by the specimens in the Museum of the College, and in those of St. George's, Guy's, and St. Bartholomew's Hospitals

‡ Philosophical Transactions, 1844, part ii.

A series of preparations in the Museum* clearly illustrates the corresponding process in the mammary gland;† but here the conditions are far more remote from the normal type. If we may believe that a series of specimens may be read as the continuous history of one case, because they seem to present successive phases of the same disease, then, we may suppose, first, the existence of a cyst, or of a collection of cysts in the mammary gland. Such cysts may, possibly, be formed by the dilatation of parts of ducts; but much more commonly, if not always, the cysts that bear vascular growths are derived through transformation and enormous growth of some elementary structure of the gland.‡ So far as I know, there is nothing peculiar in the structure of the mammary cysts that may be proliferous. They are usually ovoid or spherical, unless by mutual compression: they usually appear formed of thin fibro-cellular tissue, with or without nucleus-fibres: they have abundant blood-vessels, and are closely adherent to the surrounding parts: their walls are peculiarly apt in disease to become œdematous, succulent, and almost gelatinous. They may grow to an enormous size: a specimen is in the museum of St. George's Hospital, in which a cyst, that would contain more than two pints of fluid, has some lowly lobed growths from one portion of its inner surface; one in the College Museum, removed by Mr. Liston, weighed twelve pounds; and Dr. Warren relates a case in which he removed a tumour of this kind of thirteen pounds weight. The cysts may contain any of the varieties of serous or bloody fluid, clear or turbid, that I described in the last lecture.

Now, from some part of the inner surface of such a cyst, a vascular growth may spring; and, gradually increasing at a rate beyond that of the increase of the cyst, it fills more and more of the cavity. At length, the growth wholly excludes the fluid contents of the cyst, and its surfaces come in contact with the remainder of the cyst-walls. The growth may now coalesce with the walls of the cyst, and form one solid tumour, enclosed in and connected with them, just as ordinary solid tumours are invested and connected with their fibro-cellular capsules. Or, growing yet further and more rapidly, the growth, hitherto intra-cystic, may protrude through its cyst-walls and the superjacent integuments,—protruding through them like a hernia of the brain, growing exuberantly over the adjacent skin, and, like such a hernia, reproduced when cut away.

The time in which these changes may be accomplished is extremely various. Usually, the increase of the intra-cystic growth appears to be painless, and it may be very slow: ten years or more may pass with little change; but the increase is generally faster, and it often shows an accelerating rate; so that, late in the disease, the progress is extremely quick, even quicker than that of most cancerous growths.

The characters of the intra-cystic mammary growths are various, not only according to our observations of them at different periods of their existence, but, apparently, even from their very origin. In looking through a large series of them, while they are still in early periods of their development, we may reduce them to these chief forms; namely, (*a*) low, broad-based, convex layers, like coarse granulations; (*b*) spheroidal, lobed, and nodulated masses, cauliflower-like, attached by narrower bases; (*c*) masses or clusters of pedunculated leaf-like processes, slender, single or variously branched, and interlaced in all possible forms; (*d*) masses of firmer and much paler substance, appearing as if formed of close-packed lobes, or fimbriated processes, or involuted layers.

In apparent structure, also, the varieties of these growths are scarcely less numerous. (*a*) Some of them are opaque, yellow, and soft, yet elastic, and rather tough, so as to be separable in laminæ like fibrine-clot; (*b*) others are more vascular, succulent, and spongy, like granulations; (*c*) others are like layers and masses, or heaped-up layers, of gelatine, not firmer than size, or even like vitreous humour, yielding a tenacious synovia like fluid; (*d*) others are firm, compact, nearly pure white, imitating the mammary gland, but not succulent.

To these varieties of appearance we might add yet more, due either (*a*) to diverse shades of yellow, pink, grey, or purple; or (*b*) to the various clustering and incomplete fulness of the cysts; or (*c*) to the increasing firmness of the growths and their fusion with the cell-walls; or (*d*) to the development of new barren or proliferous cysts in the solid growths that now fill the cysts of a former generation; or (*e*) to various changes of decay or disease ensuing in either the cyst-walls or their contents.

It would be too tedious to describe all these varieties, especially while we do not yet know whether, or in what degree, these forms are related to one another, or to any

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[*] Nos. 168 to 172, &c.

[†] All the cases recorded have occurred in the female breast, except two—one by Mr. Arnott; MEDICAL GAZETTE, xxii. 378: and one by Müller; "On Cancer," p. 150.

[‡] On the difference between the solid contents of dilated ducts and those of the proper or autogenous cysts, see Mr. Birkett's account in his Essay on the Diseases of the Breast.

one typical condition of the intra-cystic growths.

Respecting their minute structure, we have good guidance in the probability that the proper mammary glandular tumours—the chronic mammary tumours of Sir A. Cooper—have their origin in intra-cystic growths transformed into solid tumours in the manner just described. These mammary glandular tumours are composed of minute structures closely imitating those of the gland itself. They present microscopic lobes, and fine tubules, lined or filled with nuclei and nucleated cells, like those of secreting organs; these, inclosed within pellucid membrane, form a pseudo-glandular substance, such as, we might suppose, needs only a main duct to enable it to discharge the office of a mammary gland. In like manner and degree, in some specimens in which the cysts and their contained growths are still easily separable, we can discern in the growths a likeness to the mammary gland itself in their minute structure.

These facts have been observed especially by Mr. Birkett, and were very well marked in a case which I was recently able to examine. It was a very large protruding tumour of the breast, removed by Mr. Lawrence from a lady 55 years old. It had been observed for thirty years, remaining like a small knot for twenty-six years, and then slowly increasing, till, at the end of five years, a red fungous mass protruded from the breast, bled freely sometimes, and discharged profusely. This, too, increased quickly, and was painful. The whole breast was removed, and the patient recovered.

The tumour measured nearly seven inches by five. The part which did not protrude beyond the level of the skin was imbedded in the substance of the gland. It consisted of numerous lobes of various sizes and shapes, and variously divided into smaller lobes; all being evidently formed of distinct cysts closely packed and compressed together. Most of these cysts were filled with intra-cystic growths; yet in many of them it was easy to pass a thin body between their walls and the surfaces of the growths, which were fixed to them on only one part of their walls. In the protruding part the same general plan of structure could be discerned, but less distinctly.

Among the solid growths that filled the cysts some showed clavate, close-packed lobes; some were nearly simple: nearly all were pale, white, greyish or yellowish, and smooth and shining; a few were spotted yellow from degeneration of their tissue. Repeated examinations showed that all these intra-cystic growths consisted essentially of a tissue closely imitating that of a gland. The edges and surfaces of the examined portions were minutely lobed or acinous, like terminal cæca. These were inclosed by well-defined, pellucid, limitary membrane; and their cavities were full of nuclei and nucleated cells, like mammary gland-cells, with some granular matter. Except in that these acini led to no distinct ducts, but seemed confusedly heaped together, the imitation of gland-structure was complete.

Now the glandular nature of these growths in the best marked cases of proliferous mammary cysts, and the probably constant relation of the mammary glandular tumours to them, as well as the analogy of the intra-cystic thyroid growths, make it probable that, in all cases, the growths within the mammary cysts are of essentially the same glandular nature, and that their various appearances are due to their being in rudimental, or degenerate, or diseased states. But we cannot be sure of this. In three cases in which I have minutely examined soft intra-cystic growths I could not recognise a glandular structure. In all, I found a basis-substance, like a blastema, which was pellucid, soft, and in one case diffluent; it had little or no appearance of fibrous structure, and no distinct fibres, but, rather, the uniformity as well as the consistence of soft gelatine. In it, as in a blastema, were imbedded nuclei and cells, which chiefly presented the forms of developing fibro-cellular tissue, like those in granulations, or lymph of inflammatory exudation: or their forms might be explained, I think, by the disorderly conditions of their production and development. Nearly similar, and equally indecisive results appear from an accurate observation of such a growth by Dr. Mettenheimer,* and from two cases related by Bruch.†

Perhaps we may conclude that in these specimens the intra-cystic growths were in a rudimental, or in a morbid, state; that the general destiny of such growths is towards a glandular structure, but that in these and the like instances they fall short of it, or swerve from the right course: but I would rather not form any conclusion at present. These are just the cases of which, as yet, the interpretation is scarcely possible, while we are ignorant of the changes that may ensue during development, degeneration, and disease.

I have said that the mammary and thyroid glands might be regarded as the elected seats for cysts having glandular growths; but they are sometimes met with in other parts, as in the prostate, and, I believe, also in the lip. In the Museum at St. George's Hospital is a tumour removed from a man's upper lip, in which it had been growing, without pain, for 8½ years. One half of it is a cyst that was filled with a thin flaky fluid, and was thought to be a dilated labial salivary duct; the other half is a solid tumour, just like a glandular tumour of the lip which I shall describe in a future lecture. The combination of a barren cyst with a proliferous one, which it seems to illustrate, is not rare in the mammary gland. In the same Museum is a cyst, with a broad vascular growth, like granulations, from its walls, which was taken from a girl's labium by Mr. Cutler. It has a small external opening, suggesting that it may have had its origin in a cystic, mucous, or sebaceous gland. Here, too, is an Hunterian specimen* of a thick-walled cyst, from the cheek of an old woman, which contains two large, lobed, and pedunculated masses so like some of those found in the mammary cysts, that we can hardly doubt their glandular nature.

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* Müller's Archiv., 1850, H. iii.

† Die Diagnose der bösartigen Geschwülste, p. 185-191.

All these specimens, however, need more minute examination; at present they only make it probable that any cyst originating in or near a secreting gland may be the parent, or the habitation, of an endogenous glandular growth.

To this account of glanduliferous cysts it must be added, that their characters may be closely imitated by cysts formed in parts altogether disconnected from secreting glands. It is not, indeed, probable that the contained growths in such cysts are glandular; yet they present characters like the softer growths that are found in the mammary cysts.

I found one of these proliferous cysts beneath the gracilis and adductor longus muscles of a woman 25 years old. It was a large spheroidal mass, which felt as if held down tightly on the front of the pelvis, and had pushed the femoral vessels a little outwards. It lay too deep to form a clear diagnosis of its nature; it was assigned to no distinct cause; it had been noticed for only seven months, but when first seen was "as large as a tea-cup." I removed it without much difficuly; for it was not closely adherent to the parts, except to a small portion of the front of the pubes, where it rested on the adductor brevis. The patient has since remained well for more than two years.

The tumour was spheroidal, about four inches in diameter, and consisted chiefly of cysts, from two of which six or eight ounces of turbid serous fluid escaped when they were cut across. One of these cysts was thickly lined with pale, brownish, fibrinous substance, like that which one finds in old hæmatoceles; and this appeared as fibrine on minute examination. Another was nearly filled with a ruddy mass, in most parts soft and succulent, like blood-stained gelatine. Much of this mass was also like fibrine-clot, with abundant corpuscles; but the layers of it next the cyst-walls were firmer than the central parts, and contained all the forms that one finds in common granulations developing into fibro-cellular tissue. The microscopic likeness to granulations was, in these parts, exact. The rest of the tumour, including some large portions between the cysts, consisted of fibro-cellular tissue more or less perfectly developed.*

A similar tumour was removed by Mr. Lawrence from the exactly corresponding part of a woman, 50 years old, in whom it had grown slowly, and without pain, for nine or ten years. It gave the sensation of a firm fatty tumor, as large as an egg, but when removed was found to be a bilocular cyst. Each cavity contained, together with serous fluid, a soft, reddish, gelatinous-looking mass, like a polypus in one, and solid and folded in the other. The cyst-walls were tough, pure-white, formed of fibro-cellular tissue, and polished on their inner surface. The intracystic growths consisted of a structureless or dimly granular or fibrillating blastema, with abundant oily molecules, granule-cells, and corpuscles, like nuclei or cytoblasts, imbedded in it.

And to these two instances, since the disease seems very rare, I may add a third. A girl, twenty-three years old, under the care of Mr. Lawrence, had a pyriform pendulous tumour in her neck, about 2½ inches long. Its surface was ulcerated, livid, and painful, and bled occasionally. Its history was doubtful; but it had existed for at least a year. On removal, it appeared to have grown in the subcutaneous tissue, and to be composed of a collection of cysts, closely and irregularly packed, and, for the most past, filled with lobed, soft, cauliflower-like growths from parts of their walls. It closely resembled, in its general aspect, the collections of proliferous cysts, with soft intra-cystic growths in the mammary gland. In microscopic structure the intra-cystic growths appeared composed entirely of corpuscles, like those of lymph or granulations: but my record of the examination is too incomplete for a clear account of them.

I believe that all the cysts that I have spoken of, before these containing glandular growths, may be regarded as completely void of the characters of malignant disease; at least, I have met with no evidence contrary to this statement. And, in general, the reputation of innocency is deserved by the glanduliferous cysts also. Yet there are cases which show that such tumours may have an almost irremediable tendency to recur after removal. A healthy robust woman, 37 years old, was under Mr. Lawrence, with a very large protruding tumour in her right breast. This had been slowly increasing for ten years, but, till lately, had given little uneasiness, except by its bulk, and had not hindered her nursing. Mr. Lawrence removed the greater part of the breast and the tumour in 1844. It weighed 7½ pounds, and was a well-marked example of that form of "sero-cystic sarcoma," in which the cyst-walls, as if altered by inflammation, or imperfectly formed, are soft, succulent, and glistening, with solid growths of similar substance, lobed and fissured. Many cysts in it still contained serous fluid. Its appearance when recent, and even now as preserved,* leaves no room for doubt as to its nature.

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* Mus. Coll. Surg. No. 167.

* The tumour is in the Museum of St. Bartholomew's Hospital.

The patient remained well for fifteen months; then a tumour began to grow under the scar, and quickly increased. After nine months' growth, Mr. Lawrence removed this also, with all the surrounding tissues. It was a soft, pale, pinkish, and yellowish mass, like soft size or jelly. It was lobed and folded, and included some irregular spaces, containing a fluid like mucus, or half-melted jelly. It was like the solid parts of the tumour last removed, and consisted of a pellucid dimly fibrillated blastema or basis-substance, in which were imbedded nuclei and abundant granulo-cells, of various forms. The sketches and account of these, which I drew at the time, make me still sure that they had none of the characters of cancer-cells, but were like nuclei or cytoblasts of ordinary form or elongated, many of which were changed by fatty or granular degeneration.

After this second operation, the patient remained well for seven months, and fully regained her stout robust appearance. But now a third tumour appeared; a fourth soon after; and both grew rapidly, till, after two months, Mr. Lawrence removed them, and all the parts bounding them. They were, in every respect, exactly like those removed in the last operation, and near them lay another not discerned before the removal. Erysipelas following this operation proved fatal, and no post-mortem examination could be obtained.

Now in the first of these operations some portion of the mammary gland was left. It is possible that some cysts already existed in this portion, and were subsequently developed into the second tumour, which, therefore, might not deserve to be called a recurring tumour, although, indeed, it appeared under the scar of the former operation, and not in the place where gland was left. But, after the second operation, there is little probability that any gland remained; and we may, with little doubt, regard the third tumour as an instance of recurrence or repetition; *i. e.*, of reappearance of the disease in an entirely new growth.

Sir B. C. Brodie* has related a case of a single recurrence of a tumour very closely resembling that just now described; and I have received from Mr. Birkett an account of a much more remarkable case, occurring in the practice of Dr. Cooke, of Trinity Square. The patient is 45 years old. In 1847 six ounces of fluid were drawn from a large cyst in her breast. After this, the integuments of the breast sloughed, and a profuse discharge of sanious fluid took place. The disease was removed in July 1847. Part of it consisted of a solid mass weighing 3½ pounds, and composed of "fungoid masses, some hard and others soft." In December of the same year, it was necessary to remove a small tumour which had appeared in or near the seat of the former operation; and again, similar tumours were removed in March and October 1848. These three small tumours did not present cysts, but were composed of a soft solid substance. A longer interval now elapsed; but a fifth operation was performed, on the same part, in June 1850. The tumour removed this time was examined by Mr. Birkett, who found "in a stroma of fibre-tissue, cysts containing the yellow, tenacious, albuminous fluid peculiar to these growths, and intra-cystic fibrous growths, in which were the terminal follicles of an imperfectly-developed gland-tissue." The patient appears now well, and the cicatrix of the last operation is quite healthy.

The liability to recurrence which even this case presented is surpassed by one recorded by M. Lesauvages,† whose description of the tumours he removed accords so closely with what was observed in the foregoing cases, that I can have no doubt they were of the same nature. The patient was 63 years old. The first tumour of the breast, which was of great size, was removed in February 1832: a second appeared, and was removed before the healing of the first wound; a third in May; a fourth in September of the same year; a fifth sprang up, and was removed in February 1833; a sixth in May; in a seventh operation, in June of the same year, three tumours were removed; but from the same spot two more arose, and these grew rapidly, and the patient died.

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* In the Museum of St. Bartholomew's, Ser. 34, Nos. 19 and 20.

* Lectures on Pathology and Surgery, p. 145.

† Archives Gén. de Médecine. Fevrier 1844; p. 186.

Now, if, as I think there need be no doubt, all these cases were examples of the proliferous cystic disease of the breast, they prove such an inveterate tendency to recurrence in this disease, as is scarcely surpassed by any even of the malignant tumours. Unfortunately no examination of such a case has yet been made after death; so that it is not possible to say whether the more characteristic features of malignant disease existed, such as the concurrence of similar disease in internal organs. Mere repetition of growth, I need hardly say, does not justify us in calling a tumour malignant; especially in the instance of a tumour in which clusters of cysts are prone to grow together; for the repetition of growth may be due merely to the peculiarity of the cysts growing in succession, and not, as they usually do, together and commensurately.

3. I have said we may not justly regard these recurring cystic growths as examples of malignant disease; yet the fact had better be here inserted, that their mode of growth may be imitated by genuine cancerous diseases.

Cancerous growths may be found in cysts under at least two different circumstances,—namely, in cysts that of themselves appear innocent, and in cysts produced within cancers.

Of the former mode of growth we have examples sometimes in ovarian cysts. Well-marked cancerous growths, usually of the medullary or the alveolar form, may grow from their walls; and herein is the best—perhaps the only unexceptionable—instance of the transformation of an innocent into a malignant tumour.

The second mode of production of intra-cystic cancers is best shown in some examples of medullary tumours of the testicle. In these* we may see a repetition, so far as the outline plan is concerned, of the intra-cystic production of thyroid gland. The great mass of the medullary disease includes smaller masses, completely incapsuled with fibro-cellular tissue, and commonly presenting a lobed and laminated form, at once reminding us of the intra-cystic mammary glandular growths, and justifying the application to them of the principles of Dr. Hodgkin's theory of the growth of cancers.

In these medullary testicles the intra-cystic medullary growths have usually filled the cysts and coalesced with their walls. In rare cases one can discern how the growths spring up as spheroidal, or as pedunculated, branching, and grouped, processes from the interior of the cysts. This condition is peculiarly well shown in a case of cancer of the clitoris, in which the whole of that organ is occupied or concealed by a cancerous mass inclosing several distinctly walled cysts, which are half filled with small, soft, and lobed cancerous intra-cystic growths.*

A further consideration of this matter would be out of place in lectures on innocent tumours.

4. I proceed to the consideration of the cutaneous proliferous cysts,—*i. e.*, of cysts on whose inner walls a tissue grows having more or less the structure and the productive properties of the skin.

Instances of these in a perfect state are rare. In the large majority of cases the cutaneous structure, if it were ever present, has degenerated or disappeared; and we recognise the relations and import of the cysts only through their containing epidermal and sebaceous materials, of which the production is a peculiar attribute of the tissues of the skin.

Among the parts in which these skin-bearing cysts may be found are some that have no natural connection with the skin. Thus (*a*) they are frequent in the ovaries; one or more Graafian vesicles enlarge and grow, and then, apparently, produce on their inner surface a growth of skin, with its layer of cutis, subcutaneous fat, epidermis, and all the minute appended organs of the proper integument of the body; or (*b*) such cysts may form in the subcutaneous tissue. They are, indeed, rare in this tissue in man, except in cases of congenital growth; but in the little cysts that are found at or soon after birth, about the brow, or in or near the orbit, the inner surface is often perfectly cutaneous; and Lebert* has detected in such cysts all the minute structures and organs of the skin. Some similar specimens of cysts lined with skin are in the Museum of the College.† These were taken from the subcutaneous tissue of a cow and of an ox; and in some of them the inner surface of the cyst could hardly be distinguished from the outer hairy integument of the animal.

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* As in Mus. Coll. Surg., No. 2396.

* Museum of St. Bartholomew's, Ser. xxxii. 39. Rokitansky gives to cases of this kind the name of cysto-carcinoma, and draws a just parallel between them and the instances of cysto-sarcoma. (Pathol. Anat. i. p. 391.) Cysto-sarcoma he regards, nearly following Müller herein, as a combination of sarcoma with cyst-formation. The cases included by him and Müller (On Cancer, p. 170) under the name, cannot be all enclosed in the groups which I have brought near together. (1.) Some are cases in which simple cysts are found within solid tumours: these are named cysto-sarcoma simplex; and such as these will be mentioned or referred to as varieties of fatty, fibrous, fibro-plastic, and cartilaginous tumours, in all of which the formation of cysts may ensue. (2.) The cysto-sarcoma proliferum, if it be correctly described as constructed of cysts contained in a solid tumour, and *containing younger cysts* in their interior, I have never seen. The case to which Müller refers as exemplifying it, and which is figured by Sir A. Cooper (Illustrations, p. 41, pl. iii.) was, I believe, an instance of proliferous glandular cyst in the mammary gland. (3.) The cysto-sarcoma phyllodes is a proliferous glandular cyst of the breast, and is especially exemplified by the cases in which the intra-cystic growths are firm, lobed, pedunculated, and clustered, and in which many cysts are close-set in the breast. But in this disease there is, I think, no solid tumour in which the cysts are set: they appear to be themselves the primary disease, the solid growths within them being secondary formations; and if this be true, they cannot properly be grouped with the examples of Müller's cysto-sarcoma simplex.

Besides these, the common seats of cutaneous cysts, perhaps any part or organ may in rare instances present them; for the records of surgery and pathology would furnish abundant instances of aberrant cysts containing hair and fatty matter, such as we must class with these in which the cutaneous structure and products are more perfect. The most singular and frequent of these rarer examples are in the testicle,‡ the lung,§ the kidney,|| or the bladder,¶ and the skull or brain. Those in the brain are of chief interest. I found this specimen** many years ago in an elderly man. While he was in St. Bartholomew's Hospital with an ulcerated leg he suddenly died; and the only probable cause of death appeared to be a mass of granular fatty matter mixed with short stiff hairs, which lay in the tissue of the pia mater under the cerebellum.

A yet more remarkable case is in the Museum of St. George's Hospital, in Mr. Cæsar Hawkins's collection. It exhibits a mass of fatty matter, and a lock of dark hair 1½ or 2 inches long, attached to the inner surface of the dura mater at the torcular Herophili. This was found in a child two and a half years old, in whom it appeared to have been congenital.

Now it is perhaps only during the vigour of the formative forces in the fœtal or earliest extra-uterine periods of life, that cysts thus highly organized and productive are ever formed. The sebaceous, epidermal, or cuticular cysts that grow in later life are imperfect, impotent, imitations of these; yet clearly are the same disease, and are, therefore, most naturally classed with the proliferous cysts, needing only to be named according to their contents. We cannot tell, in any advanced case of such a cyst, whether the more complicate structures of the skin ever existed; if they did, they have degenerated before the cyst became of distinct size; yet the retained likeness is sometimes shown in the fact that, when such cysts are laid open to the air, they do not granulate, but assume for their internal surfaces the characters of the adjacent and now continuous skin.*

Of these sebaceous or epidermal cysts it is interesting to notice the frequent hereditary origin. Perhaps, in the majority of cases, the bearers of these have known one or more members of their family similarly endowed. They are certainly more commonly hereditary than are any forms of cancer.

I have already referred to the double mode of origin of the epidermal cysts. Sir Astley Cooper first observed that some among them could be emptied, by pressing their contents through a small aperture in the cutis over them, and hence concluded that they are all examples of hair-follicles distended with their secretions and overgrown: but probably this conclusion is true for only a minority of these cysts. They are, I think, comparatively few in which an aperture can be found;† the greater part are closed on all sides alike, and must be regarded as cysts new formed, resembling, except in situation, those which are found where, naturally, no hair-follicles exist.

The characters of these epidermal cysts may be extremely various, in regard not only to their walls, but to their contents. Their walls may be thin, delicate, and pliant; or laminated, thick, and hard, with tough fibrous tissue; or they may be calcified; and I believe a general rule may be connected with the differences in these, as in other cysts, namely, that the thin-walled are the most productive, grow most rapidly, and are the seats of most active change. It would seem as if all thickenings of cyst-walls, all deposits of calcareous and fatty matters, were indications of degeneration and loss of productive power.

Among the contents of these cysts we may observe extreme varieties. The chief alone need be referred to. And, 1st, we

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* Abhandlungen, p. 99, e. s. The structure is well shown in No. 158 in the College-Museum.

† Nos. 161, 163, &c.

‡ See Goodsir, in Edinb. Monthly Journal, June 1845.

§ Kölliker, in the Zeitschrift für wissensch. Zoologie, B. ii. p. 281.

|| Mus. Coll. Surg., 1904.

¶ Mus. Coll Surg. 2626.

** Mus. St. Bartholomew's, Ser. vi. 56.

* See Home, Hunter's Works, vol. iii. p. 635; and a remarkable case by Mr. Green, in the MEDICAL GAZETTE, vol. ii. p. 346.

† Mr. South especially notices this in his edition of Chelius's Surgery, vol. ii. p. 698.

find successive productions of epidermis, formed in layers on the inner walls of the cyst, and thence successively shed, and pushed inwards towards its centre. A section of such cysts (which were particularly described by Sir Everard Home from the Hunterian specimens) presents layers of white soft epidermis, like macerated epidermis of the heel or palm. The external layers are commonly quite regular; but the internal are more disorderly, as if broken up and mingled with less organised productions. 2dly. A peculiar appearance is given to contents like these, where, among the layers of epidermal scales, abundant crystals of cholestearine are mingled. They hence derive an appearance like that of the masses to which Müller* has given the name of cholesteatoma, or laminated fatty tumour; and, indeed, the few instances of well-marked examples of this disease which I have been able to examine, as well as Müller's own account, make me think that what he named cholesteatoma is only a combination of layers of epidermal scales with crystals of cholestearine.†

The appearance produced by such a combination is quite peculiar. It forms nodular masses of soft and brittle substance, like wax or spermaceti, the surfaces of which present a bright glistening, like that of mother-of-pearl, while their sections are finely laminated. It is a rare disease; the most frequent seats of well-marked specimens appearing to be in ovarian cysts, and in connection with the membranes of the brain. The characters are well shown in the contents of a small ovarian cyst in St. Bartholomew's Hospital; and in the tumour within the occipital part of the cranium, in Mr. Hawkins's Collection, to which I have already referred. Striking examples are figured by Cruveilhier;‡ but the want of microscopic examination leaves their constitution uncertain. 3dly. In the opposite extreme to these cysts, in which the cuticular product is most perfect, we find an innumerable variety of contents, of buff- and ochre-yellow, and brownish materials, that seem to consist mainly of degenerate cuticle mingled with sebaceous secretions. The microscope finds in them a confused mass of withered scales, of granular fatty matter, clustered and floating free, of cholestearine-crystals, and of earthy matter in free molecules, or enclosed within the cells or scales. And all these may be floating in liquid, or retained in some soft tenacious mass, or clustered in hard nodular and pointed masses, projecting like stalactites from the old cyst-walls.*

One more phase of this disease deserves especial notice—that in which the cyst ulcerates, and its contents protrude. An inflammation in or about the sac often appears the inducement to this change; and sometimes the inflammation itself can be traced to nothing but disturbance of the general health. The probability that it may thus arise makes the caution very valuable which Mr. Humphry† gives concerning the removal of all tumors. "It is always well (he says) to bear in mind that persons are most likely to consult us respecting these, or other growths of the like kind, when they are out of health, and consequently unfit to bear an operation: they do so because the tumour is then most productive of pain and annoyance."

A distressing instance of the truth of this occurred to myself three years ago. A strong, but very intemperate man, came to me as an out-patient, with an ulcerated sebaceous cyst, about three-quarters of an inch in diameter, just below and to the right of the umbilicus. He had observed a tumour here for 16 years; but he had scarcely thought of it till, during the last five weeks, it had grown quickly, and in the last fortnight had ulcerated. I saw no reason to be very cautious in such a case; so slit the tumour and removed it, as well as the thickening and adhesion of the parts around would allow. In the evening, having returned to his work and some intemperance, hæmorrhage ensued from a small cutaneous vessel, and before he reached the hospital he lost more than a pint of blood. I tied the artery, and applied solution of alum to the rest of the wound, for its whole surface was oozing blood, and he was admitted into the hospital. The next day he became very feverish, and he appeared as if he were going to have typhus, which was then prevalent. But from this state he partially recovered; and then abscesses formed in his groins, and discharged profusely. Nothing improved his health, and three months after the operation he died, apparently exhausted by the continual discharge from the abscesses, and with both external epigastric veins and parts of the femoral veins full of old clotted blood—the consequence of slow phlebitis.

Cases like this, or ending fatally much sooner than this did, with erysipelas or more acute phlebitis, have occurred to many surgeons. They need no comment to make them instructive.

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* On Cancer, p. 163: West's translation.

† Other writers have applied the name of cholesteatoma more vaguely.

‡ Anatomie Pathol. liv. ii. p. 6.

* See Museum, College of Surgeons, 157 and 2297; and a most remarkable specimen in the Museum of Guy's Hospital, which was removed from an old man's thigh.

† Lectures on Surgery, p. 135, from the Provincial Medical and Surgical Journal.

I believe the contents thus protruded from cutaneous cysts may become vascular. I have not seen this event, but it seemed certain in a case observed by Mr. Reid, of Canterbury. A woman, 80 years old, had numerous cysts in her scalp. They were like common sebaceous cysts, and three of her daughters had cysts like them. Two years and a half before her death, one of the cysts, which had not previously appeared different from the rest, inflamed. It was opened, and sebaceous matter was discharged from it. The opening did not heal, but ulcerated, and a small hard lump remained under the ulcer for a year, when, after erysipelas of the head, it began to grow, and rather quickly increased to a mass nearly five inches in diameter, which occasionally bled largely. The mass has the appearance of the firm contents of a cuticular and sebaceous cyst, and contained abundant epidermal cells;* so that there can be scarcely a doubt that it had its origin in the contents of such a cyst.

Concerning cysts containing teeth, a few words must suffice. They are of two kinds. Some occurring in the ovaries, and more rarely in other parts, bear, with one or more teeth, the products of skin, as hair, epidermis, &c.* These may be regarded as diseases of the same general group with the cutaneous proliferous cysts; and the great formative power which they manifest is consistent with their occurring only in embryo or fœtal life, and in the ovaries, in which, even independent of impregnation, one discovers so many signs of great power of development.

Other dentigerous cysts occur within the jaws. In the upper or lower jaw a cyst may be found, hollowed out in the substances of the bone, lined with a distinct-looking membrane, to some part of which a tooth is attached. I believe it will be found that these are all examples of tooth-capsules, from which the teeth, though perfectly formed, at least in their crowns, are not extruded, and which therefore remain, becoming filled with fluid, and growing larger. If this view be correct we should scarcely class such cysts with tumours: but more evidence is needed on the point. Such cases are not unfrequently described as instances of a tooth being found in the antrum; but I suspect it is only the general aspect of the cavity which has led to its being regarded as the antrum. I think there are as yet no cases in which dissection has proved the tooth to have had this position.

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* Museum of St. Bartholomew's Hospital, Series 35, No. 57.

* A very remarkable specimen is in the Museum of St. Bartholomew's Hospital. It is described by Dr. Gordon, in the Med. Chir. Trans. vol. xv.

LECTURE IV.

Fatty tumours—General characters of fatty outgrowths—Structure of fatty tumours—Their varieties of form, as simple, lobed, involuted, and pendulous—Their capsules, or investing tissues, as an example of those generally connected with innocent tumours—The usual mode of occurrence of fatty tumours—Their usual seats—Changes of position—Rarer seats—Their development—Mode and extent of growth—Degenerations and diseases—Causes and general nature.

Fibro-cellular tumours—Distinguished from corresponding outgrowths—Their general and minute structure—Special examples—In the scrotum—In the labium, or by the vagina—Among muscles—In the sole—In the orbit.

Painful subcutaneous tumours—Their usual seats, structures, and relations to fibro-cellular and fibrous tumours—Their painfulness—Its supposed relation to nerves enclosing, or adjacent to, them—Differences between these tumours and the "neuromata"—Probable neuralgic nature of the pain—General observations on neuralgia in tumours.

Fatty Tumours.—Among the solid tumours, the first that may be considered is the fatty or adipose tumour,—the lipoma of some, the steatoma of others; the most simple in its texture; the most like the natural parts; the least liable to variations;—a morbid growth so well known, that I can scarcely hope to impart any interest to an account of it.

Among the growths commonly included as fatty tumours, we find examples of both the forms of morbid hypertrophies of which I spoke in the first lecture. There are both continuous and discontinuous morbid hypertrophies of fat—both fatty outgrowths and fatty tumours, more properly so called.*

The fatty outgrowth is thus described by Sir B. C. Brodie, in his well-known lecture upon fatty tumours. He says,—"there is no distinct boundary to it, and you cannot say where the natural adipose structure ends, and the morbid growth begins......... These tumours feel like fat, but they may be distinguished from common fatty tumours by their having no well-defined boundary, and by their being less soft and elastic. Such deposits may take place in any part of the body; but I have seen them more frequently in the neck than anywhere else."* Doubtless the case will be familiar to you by which Sir B. Brodie illustrates this account,—the case of a footman, with an enormous double chin, and a great mass of fat extending from ear to ear, who was cured by the *liquor potassæ.*

I can add nothing to this account, except the mention of a singular case of fatty growth connected with the heart of a sheep.† The right ventricle is nearly filled with a lobulated mass of fat, distending it, and pressing back the tricuspid valve. The left auricle and ventricle are similarly nearly filled with fatty growths, and fat is accumulated on the exterior, adding altogether about twenty-five ounces to the weight of the heart. The textures of the heart itself appear healthy, though it is the seat of all these fatty growths.

The discontinuous fatty tumours, of which alone I shall now speak, present a tissue exactly or very nearly resembling the normal fatty or adipose tissue of the animal in which they grow. Certain differences may, indeed, be sometimes found between the fat of a tumour and that of the part in which it lies; such as the larger size of the tumour's cells, its less or greater firmness at the same temperature, and the usual crystallizing of the margarine; but I believe there are no greater differences than may be found in the natural fat of different parts of the same person.

It would be superfluous to describe the minute characters of this well-known tissue: it is only in its arrangement that the tumours have any peculiarity worth notice. It is, in all, composed essentially of clustered oil-cells; but these are, in some tumours, placed in an uniform mass, smooth on its surface, and only obscurely partitioned; in others, arranged in oval or pyriform lobes, projecting on the surface, easily separable by splitting their fibro-cellular partitions: in some of these it may be dissected into thin layers, which are wrapped in each lobe, one within the other, like the leaflets of a bud. Moreover, any of these forms, whether "simple," or "lobed," or "involuted," may be either deeply imbedded in the tissues or "pendulous."

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* M. Lebert (Phys. Pathol. ii. p. 112) distinguishes the fatty tumours, according to their degrees of isolation, as Lipoma circumscriptum and L. diffusum.

* Lectures on Pathology and Surgery, p. 275.

† Mus. Coll. Surg., 1529.

Fatty tumours are, I believe, always invested with a capsule or covering of fibro-cellular tissue; and of these capsules, since they exist with most of the innocent tumours, I may speak now once for all. The capsule, then, of such a tumour is usually a layer of fibro-cellular tissue, well organised, dry, and containing blood-vessels proportioned to the size of the tumour. It appears to be formed of the fibro-cellular tissue of the part in which the tumour grows, increased and often strengthened in adaptation to the bulk and other circumstances of its contents. It grows with the tumour, invests it, and at once connects it with the adjacent tissues, and separates it from them,—as, *e. g.*, similar fibro-cellular tissue does each muscle in a limb. Its adhesion to both the tumour and the parts around it is more intimate than that of its layers to one another; so that when such tumours are cut-into, they may be dislodged by splitting the layers of their capsule, and leaving some of it on the tumour, and some in the cavity from which the tumour is extracted. This, at least, can be done easily unless the tumour has been the seat of inflammation, which may thicken the capsule and make all its parts adherent to one another, and to the tissues on either side of it.

In the capsule, the blood-vessels that supply the tumour usually first ramify. One principal artery, indeed, commonly passes straightway into the tumour at its deepest part, but the rest branch in the capsule, especially in any thicker parts of it that lie in the spaces between projecting lobes of the tumour. Hence, with the partitions of the tumour that are derived from the capsule, the blood-vessels pass into its substance.

The capsules of these fatty tumours may vary somewhat in thickness and toughness; and so may the partitions that proceed from them into the mass. They are usually very delicate; but they are sometimes thick and strong, and give a density and toughness which approaches to the characters of a fibrous tumour. To such examples of fatty tumours deviating from the common type, Müller[*] has assigned the name of Lipoma mixtum; and Vogel,[†] Gluge,[‡] Rokitansky,[§] and some others, call them "steatoma," and "lardaceous tumour"[||] (Speckgeschwülst).

Fatty tumours usually occur singly; but there are many exceptions to this rule. Two or three in the same person are not rarely seen, and a hundred or more may exist. Sir B. C. Brodie mentions such cases; and I am acquainted with a gentleman who has borne, for nearly twenty years, firm tumours, feeling like fatty masses, in the subcutaneous tissue of his trunk and all his limbs. They are usually stationary; but sometimes one grows a little, or one diminishes, or a new one appears.

The most frequent seats of fatty tumours are the trunk, and the parts of the neck and limbs that are nearest to it; but they may occur in any part where fat naturally exists, and they are not limited even to these.[*] It is, perhaps, impossible to say why they should affect one locality of fat rather than another. Their rarity in the mesentery and omentum, and the fat about the internal organs, is remarkable. I have never seen one in the recent state in any of these parts; and I know only two or three specimens in museums. One of these is in the College-Museum:[†] a bilobed mass of fat, enclosed in a thick capsule, is attached by a long pedicle to the intestine of an ox. In the trunk and limbs they appear least frequent in the parts in which the natural fat, though abundant, is subject to least variations in its quantity,—such as the palms and soles, and the bones; and they are very rarely, if ever, formed in parts of or near the trunk where no fat naturally exists, as the eyelids and the greater part of the scrotum. Fatty tumours have, indeed, been found in the scrotum;[‡] and one very remarkable case is related by Mr. Lawrence and Sir B. C. Brodie: but, perhaps, such tumours have not *begun* to grow in the part in which they were at length found; they may have grown into it or shifted into it.

This shifting of fatty tumours is worth notice; for the fact may be used in the diagnosis of them when they occur in the groin or scrotum.

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[*] On Cancer, p. 153.

[†] Pathologische Anatomie, p. 179.

[‡] Ibid.

[§] Ibid. B. i. p. 283.

[||] Müller also gives the name of Lipoma arborescens to the pendulous fatty processes with synovial membrane that are clustered about chronic diseased joints. Sir B C. Brodie describes a form of fatty tumour, which I have not yet seen, in which the tumour is covered with a double layer of membrane, like a serous sac.

[*] Müller (On Cancer, p. 153) describes one between the optic nerves and corpora albicantia; and Rokitansky (B. i. p. 282), including both the tumours and the outgrowths, refers to examples of Lipoma in the submucous tissue of the stomach, intestines, and bronchi; in the subserous tissue of the pleura, peritoneum, dura mater, and cerebral ventricles; and in the lungs, liver, and kidneys.

[†] No. 194. Another, referred to in Lecture I., is in the museum of St. George's Hospital. Other cases are related by Vogel (Path. Anat. tab. xxii. fig. 1; Gluge (l. c. Lief. viii.); Lebert (Phys. Pathol. ii. p. 105).

[‡] And Gluge mentions one in the labium of a woman, seventy years old. It was pyriform, and looked like a hernia (Path. Anat., Lief. viii. Taf. i. fig. 1).

A patient was lately under Mr. Lloyd's care in St. Bartholomew's Hospital with a strange-looking pendulous fatty tumour in the perineum. It hung like a pocket-flask between his scrotum and thigh; but he was quite clear that it was in his groin ten years ago, and that it had gradually shifted downwards. It was removed, and no pedicle or other trace of it remained in the groin.

I find, also, a case by Mr. Lyford,* in which a large fatty tumour began to grow in the abdominal wall, midway between the spine of the ilium and the pubes, and thence, as it increased, gradually moved downwards, and was excised from the upper and inner part of the thigh. And thus, in Mr. Lawrence's case, the tumour began to grow in the spermatic cord, and thence had partly extended and partly shifted into the scrotum behind the testicle, where it was extremely difficult to decide its nature.

The fatty tumours usually lie in the subcutaneous tissue, extending in it between the skin and the deeper fascia: but they may extend more deeply. Lately, Mr. Wormald removed one from which distinct lobes or prolongations passed between the fasciculi of the trapezius muscle, and, expanding below them, were constricted by them. In the case of a great fatty tumour† of the neck, removed by Mr. Liston, the operation was made formidable by the lobes of fat extending deeply to the trachea and œsophagus. In rare cases, fatty tumours may be altogether deeply seated. I found one resting on the lesser trochanter of the femur, growing up by the side of the pectineus muscle, but not prominent externally. Vogel mentions the case of a woman who had several fatty tumours, one of which was so closely connected with the nasal bone and the nasal process of the superior maxillary bone, that it was necessary to remove these with it. Mr. Abernethy also refers to a fatty tumour, removed by Mr. Cline, which adhered to the capsule of the hip-joint.‡ In the museum of the Middlesex Hospital is a fatty tumour, one and a half inches long, which was removed from beneath the tongue, where it looked like a ranula; and in the College-Museum§ is one taken from the substance of the tongue.

Such are some of the chief facts respecting the structure of this kind of tumours. Of their life, I need say little.

Their development is, probably, like that of the natural fat.

Their growth is usually slow, and without pain or any affection of the adjacent parts; but they often grow capriciously, having uncertain periods of acceleration and arrest, of which no explanation can be given. The extent of growth cannot well be measured; for fatty tumours have been cut-out that weighed between fifty and sixty pounds, and such as these, after twenty, or even fifty years, were still growing, and might have continued to do so as long as the patient lived. I believe the largest in London is that in the museum of St. Thomas's Hospital, which was removed from a man's abdomen by Sir Astley Cooper, and weighed 37 lbs. 10 oz.* One of the most formidable is that in the College-Museum, removed from a man's neck by Mr. Liston,† where it had been growing for twenty-two years. A parallel to it is drawn in the splendid work of Auvert.‡

What degenerations the fatty tumours may be liable to are not known; their diseases have some points of interest.

They may be partially indurated. The chief mass of a tumour may be found with the characteristic softness, pliancy, and inelasticity of fat; but in its substance one or more lumps, like hard knots, may be imbedded. So far as I have seen, these depend on induration, contraction, and a proportionate increase of the fibrocellular tissue of the fat; and the change is probably due to slow inflammation of the tumour. It may be sometimes traced to frequent pressure. Thus, a laundress had a fatty tumour, as large as a fœtal head, above her ilium, and portions of it were as hard to the touch as cartilage, and appeared to move so freely in the soft fat-tissue about them, that one might have thought them loose bodies, or fluid within cysts. Where these were, the patient had been in the habit of resting her linen-basket.

The indurated parts of a fatty tumour may be the seats of bone-like formations. This is, I believe, very rare; and I have seen only the single specimen in the Museum of St. Bartholomew's Hospital.§ But Auvert describes the same change.‖

Cysts, also, may form in fatty tumours. In the case with partial indurations just mentioned, I found, in another part of the tumour, a cyst with thin and partially calcified walls, which contained a glutinous and greenish oily fluid. I presume it is to tumours of this kind that Gluge gives the name of Lipoma colloides.

Suppuration and sloughing may occur in

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* Med. Gaz., iv. 348.
† Mus. Coll. Surg., No. 190.
‡ See also Brodie, l. c.; Simon, Lectures on Pathology; and others.
§ No. 1065.

* Medico-Chirurg. Trans., vol. ii., p. 440.
† No. 190.
‡ Observationes Med.-Chir. Tab. li. See, for a list of the largest elsewhere recorded, Mr. South's edition of Chelius's Surgery, ii. p. 691-2.
§ Ser. 35, 11.
‖ Tab. xvi.

these tumours: but they are on the whole very rare events, except in large pendulous tumours, which have grown too large to be effectively nourished through their bases of attachment. Pathologically these changes have little interest; but in practice they are more important, as being almost the only way in which external fatty tumours are likely to lead to death. Even in these cases, however, they show no imitation of malignant disease.*

Lastly, respecting the causes of these tumours, few things can be more obscure. Nearly all knowledge on this point is negative. The growth may have followed an injury, and we may call this the cause of its formation; but we can give no explanation why such an event as an injury, which usually produces only a transitory impairment of nutrition, or a trivial inflammation, should, in these cases, give rise to the production of a new and constantly growing mass of fat.

FIBRO-CELLULAR TUMOURS.

Under this name I propose to consider the tumours which, in their minute structure, and their general aspect, resemble the fibro-cellular, areolar, or connective tissue of the body. So far as I know, no general account of them is published. The first distinction of them was made, I believe, by Mr. Lawrence,† who described an admirable example in his paper on Tumours; and they are briefly, but accurately, described by Mr. Cæsar Hawkins,‡ as a softer and more elastic form of the fibrous tumour. Müller,§ also, refers to them by the name of Cellulo-fibrous tumour; Vogel || under that of Connective-tissue tumour (Bindegewebsgeschwülste), comparing their tissue with that of the cutis; and Rokitansky ¶ points to them as a variety of "gelatinous sarcoma." But these passing references have not obtained for this kind of tumour a general recognition, and in many works it is altogether overlooked.

The fibro-cellular is comparatively a rare tumour; and this is singular, considering the abundance of the tissue naturally existing, its general diffusion, its easy formation after injuries, in disease, and even in and about other tumours. I can in no wise explain the fact; but it is certain that for ten tumours formed of fat or cartilage (tissues which are rarely produced in other diseases), we do not find more than one formed of fibro-cellular tissue.

As in the last species, so in this, we find instances of both outgrowths and tumours,—*i. e.*, of both continuous and discontinuous overgrowths. The former are, indeed, abundant; for, among them, as being formed chiefly of overgrowing fibro-cellular tissue, we must enumerate, 1st. nearly all the softer kinds of polypi, such as the mucous or gelatinous polypi of the nose, and the polypi of the external auditory meatus;* 2dly, the various cutaneous outgrowths, such as occur in the scrotum, labia, nymphæ, clitoris, and more rarely in other parts; and, as hardly to be defined away from these, the warty and condylomatous growths of skin; and, 3dly, the overgrowths of scars, the cheloid tumours as they are named; for in all these we find overgrowing tissue, resembling, for the most part, the fibro-cellular in a more or less developed state. But of all these I shall not speak, unless for the purpose of comparing them with the discontinuous tumours.

The form in which the fibro-cellular tumours are most frequently seen is that of oval or round masses of soft, elastic, close, and pliant tissue, smooth and uniform, or, when they grow among yielding parts, deeply and variously lobed. Their exterior surface is connected with the adjacent parts by a capsule of fibro-cellular tissue, which generally splits readily. When handled they feel peculiarly tense and elastic; their outer surface may shine like a thin sack full of fluid. On their sections we see opaque white bands, intersecting a shining succulent basis-substance, of serous-yellow or greenish yellow tint. Through this basis the bands course in circles or wavy lines, or form complete partitions, or, in the smaller lobes of the tumour, they run without order, only forming white marks on the yellow ground colour, but giving no appearance of grain, or of regularly fibrous structure.

The peculiar yellow colour of the basis-substance of these tumours, makes them

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* On the possible conjunction of fatty tumours and malignant disease, see Sir B. C. Brodie, l. c. p. 282; and the same on the combination of fatty and mammary glandular tumours.

† Medico-Chirurg. Trans. vol. xvii. p. 14.

‡ MEDICAL GAZETTE, vol. xxi. p. 926.

§ On Cancer, p. 14.

|| Pathologische Anatomie.

¶ L. c. B. i. p. 336. Müller and others describe under the name of "Collonema" a tumour which I have not seen, unless it be an example of very soft fibro-cellular tumour. Rokitansky (I. 335) describes it as a very soft, tolerably clear, flickering substance, like gelatine, of greyish yellow colour. He briefly describes four specimens observed by himself. Bruch describes as a genuine example of Collonema what I can scarcely doubt was a very soft fibro-cellular tumour. Ueber Carcinoma alveolare, in Henle and Pfeufer's Zeitschrift, 1849, B. vii. p. 356.

* All the aural polypi that I have been able to examine were of this texture; but Lebert describes the specimens he has observed as having the fibro-plastic structure mentioned in the next lecture.

look, at first, like fat; it is due, however, not to fat, but to a serous or synovia-like fluid, which is infiltrated through the substance of the tumour. The mass is just like anasarcous cellular tissue; most of all like the subcutaneous cellular tissue of the back, as one sees it dissected in a dropsical body. When such a tumour is cut-through or sliced, the clear yellow fluid oozes from it, or may be abundantly pressed-out; while the filamentous tissue contracting becomes denser and more compact, and more uniformly opaque white, like that of the softer varieties of fibrous tumour. It is to these last-named tumours, indeed, that the fibro-cellular have the nearest relations, and into them that they "pass" through gradational specimens; but there is just the same difference, as well as just the same relation, between these kinds of tumours, as there is between the natural fibro-cellular and fibrous tissues, and there is a similar propriety in distinguishing them.

Examined with the microscope, the fibro-cellular tumours display the filamentous tissue or appearance characteristic of that after which they are named. In many cases, or in many parts, parallel, soft, undulating filaments are found collected in fasciculi, which interlace, and from which single filaments can often be traced out; or, where this is not seen, the texture looks filamentous, through markings or wrinkles of its surface. The best developed and most filamentous tissue is in the intersecting white bands: but similar tissue is present everywhere.

The homology of these tumours, in respect of tissue, is just as perfect as that of the fatty tumours. In chemical analysis they may yield gelatine from the well-formed fibro-cellular tissue; but I believe they yield much more albuminous matter from their imperfectly developed tissue, and from the serous fluid that is soaked in them.

In general, there is nearly complete uniformity through the whole mass of one of these tumours; oftentimes, however, different portions are more or less œdematous (if I may so call them); and, which is more remarkable, portions of cartilage, sometimes partially ossified, may be found in them. I have twice seen this. In the first case, nodules of cartilage were imbedded in a fibro-cellular tumour that grew in the ball of the great toe; and in the second (a similar tumour from the thigh), a portion of its surface, and one of its chief partitions, were formed with cartilage partially ossified.*

The most frequent seats of fibro-cellular tumours appear to be the scrotum, the labium, or the tissues by the side of the vagina, the deep-seated intermuscular spaces in the thigh, and the scalp. They may occur, probably, in many other parts; but either they particularly affect these, or else a singular chance has shown them to me in these situations almost alone.

In the scrotum I have been able to examine two cases, and have found records of four or five more. The first case is represented in a large specimen from the Museum of St. Bartholomew's, and in a drawing made shortly after the parts were removed. The patient was a carpenter, 74 years old; and, when he was under Mr. Stanley's care, the tumour had existed four years. It was a huge mass, about a foot long, and six or seven inches wide, filling the scrotum, and drawing over it all the adjacent integuments. A collection of fluid, like a hydrocele, was at its lower part, a large hernial sac was above it, and the scrotum was thick and œdematous; and the obscurities these threw upon its diagnosis, the doubt how far the hernial sac might extend, the patient's age, and his aversion for any operation for the removal of the tumour, were sufficient to dissuade from active interference.

The patient died about half a year after leaving the hospital. The tumour had attained the weight of twenty-four pounds; the testicle, with a distended tunica vaginalis lay pressed-down below it, and the hernial sac was quite clear of it above. It was easily separable from the surrounding tissues, into which many lobes extended far from the chief mass, and on section appeared partitioned into lobes of various size and shape. It had all the characters which I have described as belonging generally to these tumours, varied only by the unequal collections of blood or of serum, or by its various firmness of texture in its several portions.

A similar case was brought to Saint Bartholomew's by Mr. C. R. Thompson, of Westerham, to whom I am indebted for the history. The patient was a parish-clerk, 70 years old, a sickly-looking man, and the tumour had been nine years in progress before his death. It had been first noticed as a hardness just above the testicle; but, as it constantly increased in size, it filled the whole scrotum, displacing the adjacent integuments, and looking at first sight like an enormous hydrocele. Its surface was uneven and lobed, in some parts feeling hard and brawny, in some soft and fluctuating. For many years it was inconvenient only by its size and weight; but, about a month before his death, one of its prominent parts sloughed, and hæmorrhage took place from it. After this more extensive sloughing took place, and more considerable hæmorrhage, and the patient sank.

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* Both specimens are in the Museum of St. Bartholomew's Hospital.

The tumour had the same characters as the last, except in the part that was sloughing, which was denser and more compact, and of dark, blood-stained colour, like congested liver. This might have been thought malignant; but, with the microscope, I found only fibro-cellular tissue infiltrated with inflammatory exudation and blood; in other portions, unmixed fibro-cellular tissue.[*]

To these cases I might add one related by M. Lesauvages,[†] in which the tumour, in a man 70 years old, weighed at least 44 lbs., and was of such size that, as the patient sat with it resting on his thighs, it reached to his sternum and beyond his knees. And another of the same kind is related by Dr. O'Ferrall, which he removed successfully; but, excellent as the surgery of this case was, its pathological completeness is marred by the suspicion that a small portion of it was of cancerous structure, and by the finding of a "solitary, hard, circumscribed tuber," in the patient's liver, when, some months after complete recovery from the operation, he died with phthisis.[‡]

Of the similar tumours growing by the vagina, the best instance that I know is that recorded by Mr. Lawrence.[§] A portion of the tumour is in the Museum of St. Bartholomew's Hospital; and, though altered from its first condition, proves the identity of the disease with that of which I have been speaking.

The patient was a lady, 28 years old, and the tumour, suspended from the labium and buttock, as far back as the coccyx, reached near to her knees, was as broad as her two thighs, and measured 32 inches in its greatest circumference. It had been growing four years, and produced no inconvenience except by its weight and bulk. It was soft and lobed, and the skin was loosely connected with it. Mr. Lawrence removed the greater part of this tumour; but a portion which advanced into the labium, and along the side of the vagina, could not be eradicated: this was therefore cut across; and, when it had grown again, was removed in a second operation two years afterwards. The patient then recovered perfectly, and is, I believe, still living, without any return of the disease, more than twenty years after the operation.

Mr. Lawrence's account of the tumour, and its present appearance, leave no doubt that it was of this fibro-cellular kind.

A similar specimen, weighing more than 10 lbs., was removed by Mr. Liston from a patient 30 years old, in whom it had been growing many years, and a portion of it is in the Museum of the College.[*] Many of smaller size have been removed from the same part,[†] and I have recently met with two which have presented the same disease in another phase.

I was asked to see a woman, 34 years old, who had a tumour pendulous from the right wall of the vagina and the right nympha. It was a large flask-shaped mass, about five inches in diameter, attached by a pedicle about one inch and a half in length and thickness, over the upper part of which the orifice of the urethra was arched. All the lower part of the tumour was sloughing, and discharging an offensive ichorous fluid. The upper half was covered with healthy mucous membrane, and felt uniformly tough, pliant, and elastic.

The patient had noticed this disease for three or four years. It had begun as a tumour, projecting into the vagina from beneath its right wall, and had in this situation acquired a large size before it protruded externally. It was punctured, and then grew more rapidly; but the protrusion did not take place till about ten days before I saw the patient. After this protrusion it enlarged very quickly, and, with the sloughing, the general health suffered severely. I removed the tumour six months ago, dissecting it out with little difficulty, and the patient remains well.

It presented a well-marked instance of a very œdematous and sloughing fibro-cellular tumour, and microscopic examination found abundant inflammatory exudation mingled with the rudimental fibro-cellular tissue.

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[*] The two foregoing cases are published by Mr. Thompson in the MEDICAL GAZETTE, May 30, 1851.

[†] Archives Gén. de Méd. t. ix. p. 212, 1845. M. Lesauvages refers to another very probable case in which Bayle removed the tumour of three or four years' growth, and as large as a head. The patient died, without return of the disease, seven or eight years afterwards.

[‡] I am indebted for these particulars, beyond what were published in the Dublin Journal of Medical and Chemical Science, vol. i. 1846, to the kindness of Dr. O'Ferrall. Mr. Curling (On Diseases of the Testis, p. 51) refers to two cases of small "fibrous" tumours removed from the scrotum, in one of which the tumour was supposed to be a third testicle. These were probably of the kind here described.

[§] Medico-Chirurgical Transactions, vol. xvii. p. 11.

[*] No. 2715.

[†] Mr. Lawrence, l. c., refers to one by Mr. Earle. Cases are also described by Sir B. C. Brodie, MED. GAZ., vol. i.; Mr. Cæsar Hawkins, MED. GAZ., vol. xxi. p. 925; Mr. Curling, Proceedings of the Pathological Society, Part ii. p. 381; and (probably) by Dr. O'Ferrall, Dublin Journal, 1846, vol. i. p. 520, and vol. iv. p. 337. A specimen from a case by Mr. Keate is in the Museum of St. George's Hospital.

Within the last few weeks I have seen a case essentially similar to this; but the tumour was suspended from the labium, and the patient was about sixty years old. And this last fact is perhaps worth notice; inasmuch as, with this exception, all the cases of the fibro-cellular tumour by the vagina that I have met with have occurred in young women, while all the similar tumours in the scrotum have been in old men.

The occurrence of such tumours as these in the scrotum and labium may make it necessary that I should particularly say they are not the same disease as are the cutaneous growths that form the pendulous tumours—the elephantiasis, as it is sometimes called—of the same parts. The main differences are:—1st. That these fibro-cellular tumours may be separated or enucleated from the tissues among which they lie; whereas the cutaneous growths have no definite boundary, but are continuous with the proper tissue of the scrotum, or labium, or nympha: in short, the two diseases have the common differences between tumours and outgrowths; the overgrowing is in the one case continuous, in the other discontinuous. 2nd. In the growth of the fibro-cellular tumours, the surrounding parts, including the skin, or the mucous membrane, grow in adaptation to the tumour, but often defectively, or, at the most, only normally; but, in the cutaneous outgrowths, all the tissues take part, and the proper tissue and appended organs of the cutis are as much exaggerated as the fibro-cellular substance of the scrotum or other part. And 3dly. In the tumours, fibro-cellular tissue is the highest form attained, or, at most, a small quantity of elastic tissue is mingled with it; but, in the outgrowths, all the component structures of the skin and subcutaneous tissue are increased.

The two diseases are thus different. Still, the fact is significant, that the parts most liable to the cutaneous outgrowth are also those in or near which the fibro-cellular tumours most frequently occur; and it may be noted that, among those parts in which fatty tumours are most rare, the fibro-cellular are the most common.

For examples of fibro-cellular tumours removed from deep intermuscular spaces, I may refer to two specimens in the Museum of St. Bartholomew's Hospital. One of these was removed ten years ago, by Mr. Stanley, from an elderly man: it lay under the vastus internus muscle, and was easily dislodged from the cavity in which it was imbedded: it was a smooth spheroidal mass, thinly incapsuled, and the bright yellowish colour of its surface made it to be regarded as a firm-textured fatty tumour; but the microscope found little or no fat in it, and its present aspect leaves no doubt of its nature. The patient died after the operation, and had no similar disease in other parts.

The second of these specimens was lately removed by Mr. Savory, from beneath the tensor vaginæ femoris of a man 38 years old. It was of uncertain date, but had been observed about five months: it was firm, elastic, smooth, moveable, and painless. In the operation it was easily removed from its resting-place on the rectus muscle and the inferior spine of the ilium, and the patient recovered perfectly.

This tumour was a smooth oval mass, measuring about 5 inches by 3½. Both in general aspect and in microscopic characters it might have been taken for a type of the species, except for the peculiarity of its being at one end capped with a layer of cartilage and cancellous bone, and having nodules of cartilage set along the course of one of the chief partitions between its lobes.

To these specimens I may add another, in the College-Museum, of which Mr. Hunter has left the record that it was taken from the thigh, and had been supposed to be an aneurism.

These seem to be the most common seats of the fibro-cellular tumours, but here are specimens from other parts. One was removed by Mr. Stanley, from the sole of the foot, where, surely, we might have expected a fatty rather than any other tumour. The patient was a healthy man, 41 years old, and the deeply bilobed and very prominent tumour lay in the subcutaneous tissue over the metatarsal bones, with small lobular prolongations extending among the deeper-seated tissues. It was of eight years growth, and nodules of cartilage were imbedded in the pliant and œdematous fibro-cellular tissue of many of its lobules.

Another of these specimens was removed by Mr. John Lawrence, with the testicle, in the tunica albuginea of which it appears to be entirely enclosed. The patient was a healthy-looking man, 37 years old, and the tumour had in seven years grown to a measurement of nearly six inches by four. When first removed, it was to the eye exactly like a fatty tumour, but it contained no fat, and was a typical specimen of fibro-cellular tumour in a very œdematous or anasarcous state.

A third specimen is a tumour which I removed from the orbit of a man 40 years old, in whom it had been growing for about eighteen months. It has the general and microscopic characters of the species, but is very soft, and is composed of a cluster of small masses, looking almost like a bunch of small gelatinous polypi of the nose.*

The ten specimens which I have now produced will be sufficient, I think, to justify the giving a distinct name to the kind of tumour of which they are examples. There may be found, indeed, specimens that will connect these with fibrous tumours; but, as I have already said, if we may, among the natural tissues, distinguish the fibro-cellular from the fibrous or tendinous, so may we, so must we, make a corresponding distinction of the tumours that are like them.

I need only add a few words respecting the histories of these tumours. They have been found, I believe, only in or after the adult period of life, and in persons with apparently good general health. Their causes are wholly unknown: their development appears to be, in most cases, like that of many examples of natural fibro-cellular tissue, through nucleated blastema: for though in some I have found abundant cells lengthening and attenuating themselves into fibres, as in the organising of lymph or granulations, yet these may have been formed from exuded lymph.

The growth of these tumours is quick, in comparison with the average rate (so far as we can roughly estimate it) of innocent tumours. They often enlarge very quickly; but this enlargement is probably not growth, but swelling, through increase of the œdematous effusion: (and this difference between growth and swelling may be usefully remembered in the diagnosis of many tumours). The growth is usually painless; but about the vagina is apt to be too rapid for the superjacent tissues. Its possible extent is very great I have mentioned one tumour of 44 pounds weight, and another of 24 pounds, which was still growing.

Of the degenerations and diseases of these tumours nothing has been yet observed, except the sloughing and suppuration that occurred in one of the cases I have mentioned; and, as to their nature, all that has been said implies that they are completely innocent.

PAINFUL SUBCUTANEOUS TUMOURS form a group peculiar for the pain with which they are connected, and which is so remarkable as to justify giving a description of them separate from that of the fibro-cellular and fibrous tumours, with which, considering their other characters, they might be placed.

The painful subcutaneous tumour, or tubercle, has been often well described in relation to its general characters. Its intense painfulness was too striking to escape observation. It was described by A. Petit, Cheselden, Camper, and others; but the first, and to this time the best, general account of the disease, drawn from many instances, was given by Mr. William Wood in 1812.* Dupuytren added many instances to those which he copied from Mr. Wood's paper, and made the disease much more widely known.†

The especial seat of growth of these little tumours is, as their name implies, in the subcutaneous cellular and adipose tissue. They are most frequent in the extremities, especially the lower: very rarely they occur on the trunk, or the face.‡ They are about four times more frequent in women than in men; they rarely, if ever, begin to form before adult life, or after the commencement of old age. It is seldom that local injury, or any other cause, can be assigned for their occurrence.

The tumour usually lies just beneath the skin, scarcely prominent; it has a capsule loosely connected with all the surrounding parts, unless it be to the cutis, to which it may be tightly fixed, and which, in such cases, is generally thin, tense, polished, and like a superficial scar. Sometimes the small blood-vessels of the skin over and around the tumour are enlarged and tortuous, like those near a cutaneous nævus; but, else, all the adjacent parts appear healthy.

Tumours of this kind rarely exceed half an inch in diameter; they are usually spheroidal, oval, or cylindriform; they are firm, nearly hard, tense, and very elastic. Their outer surface is usually smooth, bright, yellowish, or greyish, or pure white; and their sections have the same aspect and consistence, or are varied by an obscure appearance of pure white fibres traversing a greyish basis.§

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* Besides these specimens, which are all in the Museum of St. Bartholomew's, I have seen two removed from the scalp, both of which, before removal, were supposed to be cutaneous cysts. A tumour removed by Mr. Humphry (Lectures on Surgery, p. 187) from a finger, and one described by Lebert (Phys. Pathol., t. ii. p. 173) as a fibrous tumour of the neck, were probably of this kind.

* Edinburgh Med. and Surg. Journal, viii., 1812. Mr. Wood first gave them the appropriate name they have since borne.

† Leçons Orales, i. 530, ed. 1832. He named them fibro-cellular encysted tumours.

‡ One is mentioned by Mr. Cæsar Hawkins, as removed from the face by Sir B. C. Brodie (MEDICAL GAZETTE, vol. xxi. p. 926); and one by Dupuytren.

§ Sometimes the tumour has a central cavity filled with fluid, as in two cases by Mr. Carruthers in Edin. Med. and Surg. Journ., vol. xxxiii.; but it is observable that in one of these, occurring in a man, a visible nerve was connected with the tumour. Perhaps this was a neuroma; for in these the cystic character is not unfrequent.

Among the painful subcutaneous tumours that I have been able to examine microscopically, one was composed of dense fibrous tissue, with filaments laid inseparably close in their fasciculi, and compactly interwoven. These appeared to have been formed in or from a nucleated blastema; for thick-set, oval, and elongated nuclei were displayed when acetic acid was added. Another was composed of well-formed fibro-cellular tissue, with bundles of parallel undulating filaments, matted or closely interwoven. With these were elongated fibro-cells,—the products, perhaps, of inflammation, to which the tumour appeared to have been subject. The substance between the filaments, and that from which they were probably developed, was here, also, a nucleated blastema. A third specimen presented obscure appearances of a filamentous structure, but no separable filaments: it seemed composed wholly of such nucleated blastema as was exposed by the action of acetic acid on the former specimens. In some parts, also, this presented appearances of filaments and nuclei arranged in concentric circles around small cavities.*

From these examples, we may believe that the painful subcutaneous tumour may be formed of either fibro-cellular or fibrous tissue, in either a rudimental or a perfect state. They may also, I believe, be fibro-cartilaginous, as described by Professor Miller,† and by many other writers. But whatever such slight diversity of tissue they may present, the characteristic of all these tumours is their pain,—pain which may precede all notice of the tumour, or may not commence till much later, or may be contemporary with it, but which, when once it has set in, may rise to very agony, such as I suppose is not equalled by any other morbid growth. It is not often constant; but, generally, without evident cause, or with only a slight touch of the tumour, a paroxysm of pain begins, and, gradually increasing, soon reaches a terrible severity. Beginning at or near the tumour, it gradually extends into all the adjacent parts, often flashing, like electric shocks, from one part of the limb to another, or to the whole trunk. Such a paroxysm may continue for a few minutes, or for several hours, and then it gradually subsides, leaving the parts sore and tender. While it lasts, the tumour, whatever may be its condition at other times, is always exquisitely sensitive; the muscles of the limb may act with irregular spasms, or general convulsions, like those of an epileptic seizure, may ensue. Sometimes, too, the tumour itself swells, the blood-vessels around it become larger and more tortuous, and the skin becomes œdematous or congested, imitating the change which sometimes ensues in a neuralgic part. There are many diversities in the characters and modes of the pain; but this belongs to all the instances of it,—that its intensity is altogether disproportionate to its apparent cause, and that it cannot be explained by anything that can be seen in the structure or relations of the tumour.

This pain suggests interesting questions in relation to the pathology of all tumours; but, before considering it, let me add some facts to complete the history of these. They appear usually to be of very slow growth. I removed one from the leg of an elderly woman, who had noticed a gradual increase of it for ten years; yet, at last, it was less than half an inch in diameter. In other cases they may more quickly attain the same size; but this seems the limit of their size; and, for any number of years, they may remain sources of intense pain, and yet undergo no apparent change of size or structure. They are usually single. I have found only one case in which more than one existed: in this case three lay close together over the great gluteal muscle.* When excised, they are not apt to recur. I removed one from the back of the leg of a lady twenty-eight years old, from whom, two years previously, a similar growth was excised from the same part. After the first operation the pain was scarcely changed; after the second it ceased, and never returned. Sir Astley Cooper† removed two painful tumours, at an interval of a year, from a young lady's leg; but these are the only instances of apparent recurrence that I have found. I believe that they have no tendency to ulcerate, or to assume any of the peculiar characters of malignant disease.‡

In considering, now, the painfulness of these tumours, the first question is their relation to nerves: are nerves involved in them? and do they, as Velpeau§ seems to hold, differ from neuromata,—*i. e.*, from the fibrous or fibro-cellular tumours within the sheaths of the nerves,—only in their position? are they only tumours within the superficial or subcutaneous nerves?

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* Like those drawn from a fibrous tumour of the uterus by Prof. Bennett (On Cancerous and Cancroid Growths, p. 189).

† Principles of Surgery, p. 630. An engraving, from the sketch by Prof. Bennett, makes this the only sure instance of fibro-cartilaginous structure. In the other recorded cases the microscope was not used; and the naked eye cannot discern between fibrous cartilage and dense fibrous tissue.

* W. Wood, l. c.

† Illustr. of Diseases of the Breast, p. 84.

‡ Dr. Warren (On Tumours, p. 60) speaks of a malignant form of the disease in which the lymphatics are affected, but relates no case of it. The case requiring amputation which he relates appears to have owed its severity to the treatment. Dupuytren (Leçons Orales, i. 542) says they have or may acquire a scirrhous nature, and then end with cancerous softening; but he refers to only one case justifying such expressions, and this case is imperfectly described.

§ Médecine Opératoire, tom. iii. p. 101.

The general opinion is against this supposition. Dupuytren says that he dissected several of these tumours with minute care, and never saw even the smallest nervous filaments adhering to their surface. I have sought them with as little success with the microscope. Of course, I may have overlooked nerve-fibres that really existed. It is very hard to prove a negative in such cases; and cases of genuine neuroma, *i. e.* of a fibrous tumour within the sheath of a nerve, do sometimes occur which exactly imitate the cases of painful subcutaneous tumour. Such a case was under Mr. Stanley's care last autumn. An elderly gentleman had for two years observed a small subcutaneous tumour over the lower part of the semi-membranosus muscle. It was easily moveable, and, till within the last three months, had not been inconvenient; but at this time it became the seat and source of pain exactly like that of a painful subcutaneous tumour. It was removed; and I was able to trace, with the microscope, an exceedingly slender nerve, the filaments of which were spread out over one part of the tumour. The tumour was within the neurilemma, and was uniformly firm, elastic, yellowish, and composed of well-formed fibrous tissue.

Many that have been called painful subcutaneous tumours may have been such neuromata as this was. Still, I am disposed to think that most of them are only so connected with nerves, as ordinary innocent tumors are, that receive a few nerve-fibres in their substance. For (1.) the connection of the nerves with even very small neuromata is not so difficult to demonstrate, but that it should have been found, if it had existed, in some of the many painfu tumours that have been examined. (2.) The neuromata often occur in large numbers in the same patient; the painful subcutaneous tumour is nearly always single. (3.) The neuromata usually grow constantly, and seem to have no limit of size; even when subcutaneous, they commonly exceed the size of the painful tumours, which generally grow to a certain small size, and in it remain stationary. (4.) Neuromata are most frequent in the male, the painful subcutaneous tumours in the female, sex. An analysis of 26 cases of neuroma taken promiscuously showed that 19 had occurred in men, and 7 in women; while in 28 cases of painful subcutaneous tumours 23 were in women, and 5 in men;—evidence which is almost conclusive for the different natures of the two diseases.

However, even if it could be proved that these painful tumours are within nerves, the question respecting the source of pain would not be fully answered. We cannot ascribe the pain to merely the altered mechanical condition of the nerve-fibres; for tumours that are evidently within nerves are not always, nor even usually, painful. It is remarkable that, in nearly all the cases in which large tumours have existed in the trunks of nerves, there has been little or no pain. The facts collected by Mr. Smith* are clear on this point. Moreover, the subcutaneous tumours themselves often remain long painless, and then become, without any other apparent change, extremely painful; and there are instances of tumours exactly resembling them, except in that pain has never been felt in them. I removed such an one from a lady's forehead. It was about as large as a pea, had been two years growing in the subcutaneous tissue, and had never given pain except once, when it was severely struck. It had all the apparent characters of structure of the painful subcutaneous tumour. I repeat, therefore, that we cannot assign the pain in these cases entirely to an altered mechanical condition of nerve-fibres in or near the tumour. We must admit, though it be a vague expression, that the pain is of the nature of that morbid state of nerve-force which we call *neuralgic*.

Of the exact nature of this neuralgic state, indeed, we know nothing; but of its existence as a morbid state of nerve-force, or nervous action, we are aware in many cases, in which we can as yet trace no organic change, and in many more, in which the sensible organic change of the nerves is inadequate to the explanation of the pain felt through them. In both these sets of cases we assign the pain (speaking vaguely) to a functional rather than to an organic disorder of the nerves,—a disorder commencing in the nerves of the part which is the focus of the pain, but transmitted from them to others which, in the nervous centres, are connected with them.

With this view of the neuralgic nature of the pain in the subcutaneous tumours many of their characters and circumstances agree. The pain is commonly paroxysmal, and sometimes regularly periodical; it is diffuse, or flashing, electric, and most intense; it often excites reflex spasmodic movements, or more severe and general convulsions; it is often aggravated by mental emotions, and the other excitants of neuralgic pains; it is sometimes attended with what is regarded as reflex vascular fulness, but it precedes no organic change.

The consideration of the probably neuralgic nature of the pain in and about these tumours is of interest in relation to the pathology of many others. The pains of many other tumours are probably, in greater or less measure, of the same nature.

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* Treatise on Neuroma.

The irritable tumour of the breast may be called a neuralgic tumour. Sir Astley Cooper's plates show, indeed, that some which he thus called were like the painful subcutaneous tumours; but the more frequent are, I believe, mammary glandular tumours, imitating in their structure the mammary gland itself. I derive this belief from the general appearance and description of several specimens, and from what I found in a recent case with the microscope. A woman, 45 years old, was under my care with a small tumour lying deep in her breast, which felt hard and not moveable, except with the tissue around it. She had been aware of this tumour for a month, and during all the time it had been the source of intense "darting and dragging" pain, which often extended from it through the chest to the shoulders, and along the neck and arms. The pain was described as so like that commonly assigned to cancer of the breast, that, judging from it, and the age and the other circumstances of the patient, one could not but fear she had cancer. However, the doubt existing made it proper to make an exploratory incision at the commencement of the operation. This was done, and the tumour, having no cancerous aspect, was alone removed. It proved to bea perfect example of mammary glandular tumour, such as I shall more fully describe in a future lecture. Thus the case seemed to be one of mere neuralgia in a glandular tumour of the breast.

Similar instances might be found, I believe, in tumours of other structures; but, without entering further on their history, I would suggest that the account of all these painful tumours makes it probable that the pain the patients feel is, in great measure, neuralgic or subjective; that it has the tumour, indeed, for an exciting cause; but that it owns, besides, some morbid condition inherent or cumulative in the nerves themselves, so that at times they respond, with a morbid exaggeration, to an habitual or slightly increased stimulus. And if this be true of the most painful tumours, it is probably true, in various measures, of many others.

LECTURE V.—Part I.

Fibrous tumours—Their distinction from the corresponding outgrowths—General form, connections, investments, and structure of fibrous tumours—Microscopic characters in different specimens—combinations with muscular and elastic tissues, and with bone—Formation of cysts, and deposit of lime-salts, constituting the "fibro-cystic" and "fibro-calcareous" tumours—Disintegration and other diseases.

Particular illustrations of fibrous tumours growing on tendinous or fibrous tissues—In the subcutaneous tissue—In or upon periosteum and bone—In or about the jaws—In the lobules of the ears—Summary of observations.

The name of "fibrous tumour" appears the best, among the sixteen or more, by which different writers have described the tumours whose chief characteristic is their likeness to the natural fibrous or tendinous tissue of the body. This, at least, seems the best for a general designation; and to those among them which are constructed of more than one elementary tissue we may give such names as "fibro-muscular," "fibro-elastic," "fibro-calcareous," &c.

The most frequent and notorious examples of the species are the fibrous tumours, or fibrous bodies, of the uterus; the "hard, fleshy tubercle of the uterus," as it was described by Dr. Baillie. From these, chiefly, the general characters of the species may be described.

First, the usual distinction must be drawn between the tumours and the outgrowths of the same structure. The uterus presents examples of both. The fibrous uterine polypi, more properly so called, are continuous outgrowths of and from the substance of the uterus; the mucous membrane, and the muscular and fibrous tissues of the uterus, growing, in variety of proportions, into its cavity and that of the vagina. The fibrous tumours, as distinguished from these, are discontinuous growths of similar tissue, in or near, not of, the substance of the uterus.*

The distinction is often difficult to make during life; for the pendulous, polypoid, and narrow-stemmed outgrowth may be imitated, in all its external characters, by a tumour growing near the surface of the uterus, and projecting into its cavity, with a gradually thinning investment of its muscular and mucous tissues. On dissection, however, the continuity of the polypus or outgrowth, and the discontinuity of the tumour, may generally be discerned, even in specimens which, like two in the museum of St. Bartholomew's Hospital, are, in external appearance, exactly alike.*

Similar differences exist among what are classed together as fibrous tumours of bone or periosteum: some, as we shall see, are tumours; some are outgrowths, and the line of distinction cannot be well drawn.

The fibrous tumours, of which alone I shall at present speak, appear to have a natural tendency towards a spherical or oval shape, with a smooth or superficially lobed surface; but from these marks they often deviate, in adaptation to mutual pressure or the different resistances of surrounding parts. When, for example, a fibrous tumour is pendulous, its more dependent portion usually grows most, and it tends from the spheroidal to the pyriform shape; or when one grows into a cavity, it is apt to assume the shape of that cavity, whatever it may be, or else to become deeply lobed. Such varieties as these are often seen in the fibrous tumours of the upper jaw, according as they grow into the antrum or project into the cavity of the mouth; and greater diversities occur among many specimens of the fibrous tumours and polypi of the uterus.

The fibrous tumours have usually a complete fibro-cellular capsule; and in the uterine walls this is sometimes peculiarly dry and loose, so that when one cuts on the tumour, it, almost of itself, escapes from its cavity or bed. So, too, are covered the fibrous tumours in the subcutaneous tissue and the nerves, and those parts of the fibrous tumours and outgrowths from bones which are in contact with other tissues than those from which they spring.

To the touch, the fibrous tumours are usually very firm, often extremely so; they may even be as hard and incompressible as hard cancers are. If they are soft, or "fleshy," or succulent, it is, I think, always through œdema or inflammatory softness and infiltration of their substance; for such characters as these are very rare, except in the case of the pendulous or protruding tumours, or in those that are manifestly diseased. Moreover, in all ordinary cases the fibrous tumours are heavy, very elastic, and very tense, so that their cut surfaces rise in convexities like those of intervertebral fibrous cartilages.

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* The distinction is expressed by M. Cruveilhier (Anatomie Pathologique) by the terms "corps fibreux implantés," and "corps fibreux non implantés;" but the "corps fibreux" of the breast, which were described by him, and led to the renowned discussion at the French Academy of Medicine, were, for the most part, mammary glandular tumours, and nearly solidified proliferous cysts.

* Series xxxii., Nos. 12 and 34.

In the examination of sections, the most ordinary characters that one sees are, that the tumours present a greyish basis-substance, nearly homogeneous, and intersected with opaque, pure white bands and lines. They have a general resemblance in their aspect to a section of fibrous cartilage, such as that of the semilunar or the intervertebral cartilages. Many varieties, however, appear; the basis substance tending towards yellow, brown, or blue, and the white lines being variously arranged.

It would be tedious to describe minutely these various arrangements: let it suffice that there are three principal, but often mingled, plans.[*] In some tumours the bundles of white fibres tend to form concentric circles round one or many centres; so that in the section we have a vague imitation of the aspect of the intervertebral fibro-cartilages, the appearance of concentric fibres representing an arrangement of layers successively enclosed, in the same involute manner as I described in one of the varieties of fatty tumours. These are generally the hardest and least vascular of the fibrous tumours; usually, too, they are spherical.

In another variety of the tumours, the white bands course in variously sweeping curves and undulations, the components of the larger bundles diverging and interlacing. In another, the fibres are less fasciculate, and appear as if closely matted in a nearly uniform white substance; and, in the extreme specimens of this form, which are most commonly found on the jaw-bones, a fibrous structure is scarcely to be discerned with the naked eye: they look nearly uniform, pale or white, and very firm; but the microscope proves their identity with the other varieties.

As on the exterior, so in sections, these tumours present various degrees of lobular arrangement. Some are uniform and scarcely partitioned; while others are formed in distinct and easily separable pieces; and between these are numerous intermediate forms.

As a general rule, the vascularity of a fibrous tumour is in an inverse proportion to its singleness and toughness of construction; for the blood-vessels, as in the natural fibrous structures, are distributed chiefly or exclusively in the fibro-cellular tissue partitioning and investing the denser substance. The tumours thus present various degrees of vascularity. Some, when the vessels of the uterus are fully injected, appear still quite white; but some appear as highly coloured with the injection as the uterus itself.[*]

In microscopic examination, one finds, among the fibrous tumours, certain varieties of composition which are not always, if at all, expressed in their more manifest characters. In all, I believe, a large portion of the mass consists of tissue resembling the tendinous or fibrous, more or less perfectly developed, and variously arranged.[†] This is the case in all parts of the tumour—in the more homogeneous basis-substance as well as in the intersecting bands; the microscopic differences between these parts consisting, I think, only in the less or more regular arrangement of the fibrous structure or fibrous appearance of the tissue. But in different specimens, or even in different parts of the same, the tissue appears less or more perfectly formed; so that, while in some, distinct filaments or undulating fasciculi may be dissected out, in others there is rather a fibrous appearance than a fibrous structure. Commonly, too, one finds nuclei or cytoblasts strewn through the substance of the tumour; the less abundantly, I think, the more perfect is the fibrous character of the tissue. But in all these respects there are not, I think, more or other differences among fibrous tumours than might be found in a series of natural fibrous tissues.

With these constituents, other elementary tissues are mingled in certain fibrous tumours. In those in the uterus, smooth or organic muscular fibres are more or less abundant. I have not, indeed, seen such a specimen as would quite justify the name of "muscular" tumours assigned by Vogel: but the mingling of the muscular fibres, as if in imitation of the tissue of the uterus itself, is usual, if not constant, in the uterine tumours.

In the subcutaneous fibrous tumours, and in some, I believe, of the uterine tumours also,[‡] elastic fibres, with all their fully developed characters, may be intermingled with the more abundant fibrous tissue. The structure of fascia is thus imitated; and if we call the kind last mentioned "muscular" tumours, these should be named "fascial."

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[*] See Nos. 2666, 2671, 2672, in the Museum of the College of Surgeons.

[*] Remarkably good specimens illustrating these points are in the Museum of the Middlesex Hospital.

[†] Some of the best examinations are by Valentin, in his Repertorium; and by Bidder, in Walter; Ueber fibröse Körper der Gebärmutter-p. 37.

[‡] See Bidder, in Walter, l. c., p. 38. I have found, also, in a subperitoneal fibrous tumour in the stomach, elastic fibres just corresponding with those of the natural subperitoneal tissue.

Again, in the fibrous tumours on bones, bone, in small plates or spicula, is often present; or there may be mixtures of fibrous and cartilaginous tissue. Possibly, also, other mixtures of tissues may occur in what we commonly accept as fibrous tumours; but I suppose that a general statement may be truly made to the effect that the common characters of fibrous tumours, such as I just described, are usually modified towards an imitation of tissues in or near which they are severally placed.

Their structural homology is thus complete; and I presume they may be equally similar in chemical properties. All yield gelatine on boiling; but I am not aware of any examination of their other constituents.

To the varieties of the fibrous tumour already named, two must yet be added, depending on changes which we may regard as degenerations. One consists in the formation of cysts, the other in the deposit of calcareous and other salts in the substance of the tumour; suggesting, severally, the names of the "fibro-cystic," and the "fibro-calcareous" tumour.

The formation of cysts is not rare in fibrous tumours, especially in such as are more than usually loose-textured. It may be due to a local softening and liquefaction of part of the tumour, or to an accumulation of fluid in the interspaces of the intersecting bands; and this is the probable mode of formation of the roughly bounded cavities that may be found in uterine tumours. But, in other cases, and especially in those in which the cysts are of smaller size, and have smooth and polished internal surfaces, it is more probable that their production depends on a process of cyst formation, corresponding with that traced in the cystic disease of the breast and other organs. The whole subject, however, in relation to the origin of the cysts, needs further consideration; and I will speak only of the general appearance of the fibro-cystic tumours.

First, then, we find examples of fibrous tumours thickly beset with small well defined and lined cysts. This appears to be the nature of the "hydatid testis" described by Sir A. P. Cooper: at least, most of the specimens that I have seen of it make me think that this is, essentially, a fibrous tumour in the testicle, with more or less of cyst formation in the tumour. A similar condition may be found, but is rare, in fibrous tumours of the uterus. It may be found, also, I believe, in fibrous tumours in nerves and other parts.

In another set of cases, we find one large cyst existing alone, or far predominating over all the others, in a fibrous tumour. This is most frequent in the tumours in the nerves,* and in the uterus. In the latter organ it has peculiar interest, because the cyst, if it attain a great size, may be mistaken, and treated for an ovarian cyst. Several such cases have happened. The preparation from one is in the Museum of the College;† the history of which, sent by Sir Everard Home, is, that it is "A portion of an uterus, in which a very large encysted tumour had formed. The patient had been twice tapped, and the cyst emptied The case was supposed to be ovarian dropsy during life." In another case, Mr. Cæsar Hawkins, suspecting ovarian disease, drew fifteen pints of fluid from a great cyst in a fibrous tumour of the uterus.‡ The patient died a long time afterwards, and the specimen, which is in the Museum of St. George's Hospital, shows an enormous fibrous tumour in the side wall of the uterus, having one vast cavity, and in its solid part many small cysts.

With regard to the fibro-calcareous tumour, it is to be observed that two methods of calcification exist,—a peripheral, and an interstitial. In the former, which is the rarer, we may find an ordinary fibrous tumour coated with a thin, rough, nodulated layer of chalky or bone-like substance.§ In the latter method, a similar substance is deposited more abundantly throughout the tumour, and is usually so arranged, that, by maceration, one obtains a heavy hard mass, variously knotted, and branched like a lump of hard coral. Such a specimen is here:‖ it was found in a grave-yard, and was sent to Mr. Hunter as an urinary calculus; and a good one it would have been, seeing it is about five inches long. On analysis it yielded 18·644 per cent. of animal matter, consisting of gelatine, with a small proportion of albumen; and its other chief constituents were found to be phosphate and carbonate of lime, the proportion of carbonate being greater than in human bone.

A similar, but larger, specimen is in the Museum of St. George's Hospital; and one yet larger in that of the Middlesex Hospital, which has been described, with a history full of interest, by the President.¶

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* See Smith on Neuroma, p. 6.

† No. 2657.

‡ MEDICAL GAZETTE, vol. xxxvii. p. 1022. This specimen and others are described by Mr. Prescott Hewett in the London Journal of Medicine. See, also, on suppuration in these cysts, Dr. Robert Lee, in the Med. Chir. Trans. vol. xxxiii.

§ As in Mus. Coll. Surg. No. 2670.

‖ Mus. Coll. Surg. No. 266.

¶ Medico-Chirurgical Transactions, vol. xxiii. p. 199.

Now, the change which ensues in these cases is not ossification; true bone, I believe, is not formed in the fibrous tumours of the uterus. The change is a calcareous degeneration, consisting in an amorphous deposit of salts of lime and other bases in the place of the fibrous tissue.[*] But the process is important, as being the manifestation of a loss of formative power in the tumour. The calcified fibrous tumours probably never grow, and are as inactive as the calcified arteries of old age.[†]

With these degenerations I may mention, (though it has probably more of the nature of a disease), a softening of fibrous tumours, in which, quickly, and apparently in connection with increased vascularity and congestion, they become œdematous, and then, as their tissue loosens, become very soft, or even diffluent, or else break up, and appear shreddy and flocculent. In this state the outer and less softened part of the tumour may burst, or they may suppurate or slough.[‡]

The most frequent seat of fibrous tumours is, beyond all comparison, in the uterus. Indeed, we may hold that the fibrous uterine tumours are the most frequent of all innocent tumours; Bayle's estimate being probably true, that they are to be found in 20 per cent of the women who die after 35 years of age. But I shall not dwell on the fibrous tumours in the uterus, fully described as they are by Dr. Robert Lee, and other writers on uterine pathology. I will only say, that such tumours may occur near, as well as in, the uterus; but that, in respect of this nearness, they are probably limited to those parts in which fibrous and smooth muscular tissue, like those of the uterus, extend; namely, to such parts as the utero-rectal and utero-vesical folds, and the broad ligaments.[§]

Next to the uterus, the nerves are the most frequent seats of fibrous tumours. But of these, while I can refer to the splendid monograph by Dr. Smith, I will say only that, among the neuromata the fibrous tumours reach their climax of multiplicity, existing sometimes in every nerve of the body, and amounting to 1200 or more in the same person.

So, too, I will pass by the fibrous tumours of bones, referring for these to Mr. Stanley's Treatise on the Diseases of the Bones, and to Mr. Cæsar Hawkins's Lectures on their Tumours.[*]

Instead of these instances of fibrous tumours, the histories of which have been so fully written, I will select for illustration some that are less generally studied, especially those that are found in the subcutaneous tissue, and deeply seated near the periosteum, or other fibrous and tendinous structures.

The fibrous tumours of the subcutaneous tissue, to which those of the submucous tissue closely correspond, pass, as I have already said, with insensible gradations into the fibro-cellular. Many may be found that might deserve either name; but it is not very rare to find specimens with all the distinctive features ascribed to the fibrous tumours of the uterus. These form firm, nearly hard, and tense, round or oval masses imbedded in the subcutaneous fat, raising and thinning the cutis. They may here attain an immense size, as in a case from the Museum of Mr. Liston.[†] A tumour, weighing upwards of 12 pounds, is here shown, which was removed from the front of a man's neck, together with a portion of the integuments and platysma that covered it. It was fifteen years in progress, and has now an aspect such as, I think, belongs only to a fibrous tumour. Specimens, however, of this size are very rare; they are commonly removed while less than an inch in diameter.

In microscopic characters the subcutaneous fibrous tumours have the general properties of the species, but they commonly contain elastic tissue, and they are apt, I think, to be lowly developed, having only a fibrous appearance, or even seeming composed of an uniform blastema, with imbedded elongated nuclei, like the material for the formation of new tendons.

A peculiar and important character in these fibrous tumours is, that though they may be completely isolated in every other part, they often adhere closely to the lower surface of the cutis, and that, if in any degree irritated, they soon protrude through it, and form vascular masses,—'fungous growths' as they are called. When this happens they may bleed profusely, and in a manner which, I believe, is not imitated by any other innocent tumour. Nearly five years ago, a woman 52 years old was under Mr. Stanley's care, with a tumour

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[*] On the appearance of a crystalline form in the deposits, see Dusseau; Onderz. van het Beenweefsel en van Verbeeningen in zachte Deelen. Pl. vii.

[†] A remarkable exemplification is in Mr. Arnott's case. In 40 years a calcified tumour did not more than double its size.

[‡] The whole of this process is extremely well described in Mr. Humphry's Lectures on Surgery, Lec. xxvii. p. 139

[§] It appears, indeed, to be this mixed tissue to which the fibrous tumours particularly attach themselves; for they are in close relation with it in other parts besides the uterus,—*e. g.*, in the skin, and the sub-mucous tissue of the digestive canal and other parts.

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[*] MEDICAL GAZETTE. vols. xxi.-ii.-v.

[†] Mus. Coll. Surg., 222.

that projected through the integuments in the inner part of the thigh, its base being imbedded deep in the subcutaneous tissue, and its surface protruding raw and ulcerated. The origin of this tumour was uncertain, but it had existed more than nine years; it had grown quickly, and had begun to protrude within two and a half years. From its ulcerated surface hæmorrhage frequently ensued; and the patient stated that at one time two quarts of blood flowed from it. The tumour was excised, and large vessels that entered its base bled freely in the operation. It appeared to be a well-marked specimen of a soft and lowly developed fibrous tumour.

A similar case was under my care in a woman 27 years old. The tumour, of three years' growth, and protruding over the front of the tibia, was similarly ulcerated, and used often to bleed; sometimes it bled largely, and once as much as half a pint of blood flowed from it. This also on removal appeared to be a fibrous tumour.

I have here, through the kindness of Mr. Birkett, a specimen of a much more formidable example of the same fact. A woman, sixty years old, had a large pendulous tumour in the front wall of her abdomen, suspended just below the umbilicus, and reaching half-way to her knees. Its surface had a very inflamed appearance, and the separation of a slough from its posterior part gave issue to such hæmorrhage as proved quickly fatal.

The tumour is a large, heavy mass, which was attached to the sheath of the rectus. It is every where firm and tough, except where its substance appears broken by blood issuing from numerous large vessels that traverse it. Mr. Birkett, who examined it soon after the patient's death, found its texture certainly fibrous.*

The fibrous tumours that occur in or near accumulated fibrous tissues are well exemplified, medically, by those of the dura mater, and, surgically, by those which may be found at the tarsus or metatarsus imbedded among the complicated ligaments and other deep-seated parts. Some well-marked specimens are in the Museum of the College. One,† from the collection of Mr. Langstaff, is an oval tumour, six inches long, fixed to the periosteum of the tarsal bones and to the adjacent parts, and filling the sole of the foot from the os calcis to the basis of the first phalanges. It was removed, with the foot, from a nobleman, thirty-five years old, in whom it had been observed gradually increasing for thirty years. It has all the general aspects of the fibrous tumour, as typified in those of the uterus.

A very similar specimen is shown in a tumour growing over the whole length of the dorsal aspect of the metatarsus;* and with these may be mentioned a tumour† which has some historic interest, for it was removed from the Hon. William Wyndham, the associate and friend of Pitt, and Fox, and Burke,—"the model of the true English gentleman." When he was sixty years old, and an invalid, he exerted himself very actively one night in saving from fire the library of a friend. During his exertions he fell and struck his hip; and from that injury the tumour appeared to derive its origin. It grew quickly, and in ten months it seemed necessary to remove it. Mr. Wyndham submitted to the operation, his biographer says, "with neither hope nor fear;" and it would be difficult to describe so briefly a more unfavourable state of mind. The operation was performed by Mr. Lynn. The tumour was attached to the capsule of the hip, and was with difficulty removed. At first all went well; but then, it is said, symptomatic fever came on, and death occurred on the 16th day. The tumour was, by Mr. Wyndham's request, placed in the Museum of this College; and I have had it sketched because it might be signalized as one of the most characteristic examples of this species.

I might add several to these cases, but these mav suffice for illustrations of the fibrous tumours connected with the deep-seated fibrous tissues. All the specimens that I have seen have presented the strong white bands intersecting a greyish or dull white basis-substance, the characteristic firmness, heaviness, and tension; all, in microscopic examination, have shown the tough fibrous structure or appearance; all have yielded gelatine in boiling.

The fibrous tumours in the subcutaneous and deeper tissues are isolated, discontinuous growths, circumscribed by fibro-cellular tissue. In this they differ from most of those in the group of which I shall next speak — namely, the fibrous tumours connected with periosteum and bone; for these accord with the characters of outgrowths rather than of tumours, in that they involve the substance of the periosteum, including it, and investing or covering the bone.

The favourite seats of the fibrous tumours of bone and periosteum are about the jaws; on other bones they are very rare.* The College-Museum is, I suppose, pre-eminently rich in fibrous tumours connected with the jaws, containing as it does the chief of those that were removed by Mr. Liston,—a series illustrative at once of his admirable dexterity, and of his sound knowledge of pathology.

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* This specimen was sent to the Museum of Guy's Hospital by Mr. Nason.

† No. 220. The other half of the same is in the Museum of St. Bartholomew's Hospital, Series 35, No. 9.

* Mus. Coll. Surg., 219.

† Mus. Coll. Surg., 218.

These tumours of the jaws may, to both touch and sight, present the ordinary characters of the fibrous tumours, as already described. They usually approach the round or oval shape, but are generally knobbed, or superficially lobed, or botryoidal as some have called them. They are firm, dense, and heavy. On section, however, the majority of them, I think, are more uniform than the fibrous tumours of other parts. They are generally almost uniformly white, and scarcely intersected by any fibrous bands, except such as may divide them into lobes. Many of them also present, in their interior, minute spicula of compact, white, bony texture.

As to situation and connection, the fibrous tumours of the jaws may be found isolated and circumscribed, growing within the jaw, divorcing and expanding its walls, and capable of enucleation;† but, in the large majority of these tumours, the periosteum, with or without the bone itself, is involved and included. In the case of the upper jaw, either the periosteum, or the fibro-mucous membrane of the antrum or nasal walls, or both of these, may be included in such a tumour. In all cases the tumour lies close upon the bones, and cannot be cleanly or without damage to it separated, except on the outer surface: commonly, indeed, bony growths extend from the involved bone into the tumour; and sometimes the greater part of the bone is as if broken up in the substance of the tumour.

In all these characters of connection the fibrous tumours of the jaws resemble outgrowths; they are as if some limited portion of the periosteum were grown into a tumour overlying or surrounding the bone. The character of out-growth is indeed generally recognised in the epulis, or tumour of the gums and alveoli; but I believe Mr. Hawkins is quite right in the view which he has expressed, that the genuine fibrous epulis should be regarded as a fibrous tumour growing, like most of the other fibrous tumours, from the bone and periosteum, and continuous with them.* That it is prominent and lobed is because it grows into the open cavity of the mouth; and it resembles gum only because it carries with it or involves the natural substance of the gum.

I will refer to but one more set of cases of fibrous tumours—those, namely, that occur in the lobules of the ears. These are, indeed, trivial things in comparison with the tumours of the jaws, yet they have points of interest, in that they grow after injuries, and are very apt to recur after removal. They are penalties attached to the barbarism of ear-rings. Shortly after the lobules of the ears have been pierced, it sometimes happens that considerable pain and swelling supervene. These are apt to be followed by a more defined swelling in the track of the puncture; and this swelling presently becomes a distinct, circumscribed, and well-marked fibrous tumour in the lobule of the ear.

There may be, perhaps, some doubt whether the growth be a proper tumour or a cheloid growth of the cicatrix-tissue formed in the track of the wound; but it has all the aspect of a distinct fibrous tumour, and the skin appears unaffected.

In one case, of which the specimens were presented to the museum of St. Bartholomew's Hospital† by Mr. Holberton, a tumour, such as I have described, formed in the lobule of each ear of a young woman a few months after they were pierced for ear-rings. Both the lobules were cut off with the tumours; but, in or beneath one of the cicatrices, a similar tumour formed shortly afterwards. This was excised; and, in the ten years that have since elapsed, there has been no return of the disease.

In another case, sent to me by Mr. Barrow, of Ryde, two such tumours formed in the same ear after puncture. One of these was cut away, the other was left: a third grew, and the excision of the whole lobule was necessary for the complete extirpation of the disease.

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* The College-Museum contains only two specimens—Nos. 802 and 804.

† For such cases see the Museums of St. Bartholomew's and Guy's Hospitals; Stanley, Illustrations, pl. 16, fig. 8; Ward, Proceedings of the Pathol. Soc., Vol. 2, p. 148.

* I say *fibrous epulis*, because cases may be found resembling common epulis in many characters, yet differing in some, and especially in microscopic structure. M. Lebert classes epulis with fibro-plastic tumours, and I shall refer to specimens justifying the arrangement; but I have also examined some that were of a purely fibrous texture. The subject needs further inquiry, and is of great importance in surgery; for there is always uncertainty about the operations for epulis, probably because among the firm lobed outgrowths from the gums and jaws, to all of which the name is applied, there are two or more kinds of tumours, with as many different properties. The lecture of Mr. Hawkins (MEDICAL GAZETTE, vol. xxxvii. p. 1522) is the best study on the subject of epulis. Mr. Birkett tells me he has found the glands of the gum much developed in some instances of tumours thus named.

† Ser. 35, No. 24.

Similar cases are recorded by Bruch,[*] Venzetta,[†] and others; but the histories of the cases are so like these that I need not detail them.

Among tumours so diverse in their seats and relations as the fibrous tumours, there are perhaps few things relating to their life that can be stated as generally true.

In the uterus many may exist at the same time: the whole wall of an uterus may be crammed with them, while others project from it into the peritoneal cavity. As Walter and others have observed, when a fibrous tumour fills the cavity of the uterus, or projects from it into the vagina, it is not usual for another to be found in the walls. Such cases do indeed occur, but they are comparatively rare. It is yet much more rare for fibrous tumours to be found in any other part at the same time as in the uterus. I find but one such case recorded; a case by Dr. Sutherland,[‡] in which, with several fibrous tumours in the uterus, one was found in the groin of a lunatic 42 years old. But such a case is a most rare exception to the rule; or, indeed, may be more like an example of the rule, if the tumour were connected with the round ligament, and the therein continuous tissue of the uterus.

In the nerves, as in the uterus, a multiplicity of fibrous tumours may be found; but so far as I know the rule of singleness prevails in every other part liable to be their seat.

The development of fibrous tumours is usually, I believe, through nucleated blastema.

Their growth is often very slow, so that tumours of thirty or more years' standing are found still far short of the enormous dimensions of some of the last species. But no general rule can be made on this point, especially since the rate of growth is influenced by the resistance offered by the more or less yielding parts around.

The extent of growth appears unlimited; and among the fibrous tumours are the heaviest yet known. They have weighed fifty, sixty, and seventy pounds. The tumour that induced Walter to write his admirable essay[*] weighed seventy-one pounds. He refers, also, to one of seventy-four pounds, and to one described in an American journal as having been estimated at one hundred pounds; but he asks of this, perhaps impertinently, whether it were weighed also (aber auch gewogen?).

In relation to the degeneration and diseases of fibrous tumours, I need add nothing to what has been said concerning the formation of cysts, the calcification, and the process of softening or disintegration.

And respecting their nature, as being innocent or malignant, I must delay to speak till I have described some tumours that seem nearly related to them.

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[*] Die Diagnose der bösartigen Geschwülste.

[†] Annales de Chirurgie, Juillet 1844; and Medico-Chirurgical Review, Oct. 1844.

[‡] Proceedings of the Pathological Society, vol. ii. p. 87

[*] Ueber fibröse Körper der Gebärmutter. Dorpat, 4to., 1842.

LECTURE V.—Part II.

Fibroid or fibro-plastic tumours—Origin of the name—Their apparent structure——Usual seats and relations—sectional and microscopic characters—Cases of the disease—its aptness to recur—Cases apparently of a malignant form—Account and examples of a peculiar form of recurring fibroid tumours, and of malignant fibrous tumours, with observations on the diseases that seem intermediate between the innocent and the malignant.

Fibro-plastic Tumours.—M. Lebert* has given this name to a group of tumours which he first clearly described. The characters of the group are, in many specimens, well marked, and quite distinct from any other species of tumour that I have yet seen; but I must admit myself unsure at present of the exact boundaries and relations of the group. It may, indeed, seem to some that it would be more prudent not to devote a separate description to these tumours; but our conceptions of well-settled species are made so vague by including too wide a range in our descriptions of them, that the inconvenience of premature subdivision will be less than that of indefinite generalities.

The fibro-plastic tumours bear a slight resemblance to both the fibro-cellular and the fibrous, in their general appearance and usual history; but the relation of these several groups may, perhaps, be more strongly indicated by the existence of intermediate forms, and, as Lebert implies, by the fact that the fibro-plastic tumours are, in great part, composed of microscopic bodies such as are found in ordinary granulations, in progress of developing fibro-cellular or fibrous tissue. It may be thought that, as, among the fibrous tumours, we may find some composed of nucleated blastema, which is one of the forms rudimental of fibrous tissue, so, in these, we may have examples of masses composed of such varieties of nucleated cells as are found in the other most usual rudimental form of the same tissue.†

The term "fibro-plastic" is employed by M. Lebert in consideration of these cells, and to imply that the tumours are principally composed of those forms of elongated or caudate nucleated cells which he names "fibro-plastic," which some have called "fibro-cells," and which Schwann showed in progress of development or moulding into fibres. Lebert employs this term instead of "sarcoma," or "simple sarcoma,"—the name under which he believes most of the specimens of this tumour were included before his time, as, indeed, they still are by some writers. One can hardly doubt the propriety of dismissing all such names as "simple sarcoma," under which so much confusion and error have been registered; and the term proposed by M. Lebert may well be employed till a better history of the tumours grouped under it may enable us to designate them better.*

The fibro-plastic tumours may be found in many situations. Those which I have been enabled to examine completely have been on the upper and lower jaws, in the mammary gland, and in the neck, near the thyroid gland. M. Lebert mentions, besides these situations, the bones in general, the eyelids and conjunctivæ, the subcutaneous tissue, the cerebral membranes,† and the uterus.‡

In connection with this variety of place, they may vary in external form; but their tendency is to the spherical shape. According to their general consistency, M. Lebert describes two principal varieties—a softer and a firmer. The softer variety, exemplified by the aural polypus, is yellowish, succulent with thin yellow fluid, soft but elastic, rather tough, and, in both general and microscopic characters, like the substance of exuberant weak granulations.[*] The firmer variety is that which alone I have been able to recognise as a distinct tumour, and which alone, therefore, I shall especially describe.

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* Physiologie Pathologique, t. ii.; and Abhandlungen aus dem Gebiete der praktischen Chirurgie.

† On this double plan of development of fibro-cellular and fibrous tissue see Lectures on Repair and Inflammation, Medical Gazette, 1849-50.

* The analogy of other innocent tumours makes it probable that we shall be able to trace a likeness between those of the fibro-plastic kind and some of the natural structures. Their minute structures bear, indeed, a resemblance to those of granulations; but it will be well to keep in mind that the cells with many nuclei, which are, I think, most characteristic of them, and often most abundant, are very rare in granulations. They have made me suspect that the more proper homology of these tumours may be found in their likeness to the glands without ducts, especially to the thyroid gland.

† See on these, more particularly, a paper by Lebert in Virchow and Reinhardt's Archiv., B. iii., H. iii. 1851.

‡ Structures like them form, also, according to him, many specimens of epulis, and the polypi of the external ear. It is probable that the two tumours of the jaw and the conjunctiva to which Müller refers (On Cancer, p. 19), under the name of "benignant albuminous sarcoma," were of this kind.

The tumours of this variety, then,—the proper fibro-plastic tumours,—are usually well defined, and either invested with a fibro-cellular capsule, or else easily separable from the surrounding tissues. They feel like uniformly compact masses, but are in different instances variously consistent. The most characteristic examples are firm; and (if by the name we may imply such a character as that of the muscular substance of a mammalian heart) they may be called "fleshy." Others are softer, in several gradations to the softness of size-gelatine. Even the firmer are brittle, easily crushed or broken; they are not tough, nor very elastic, like the fibro-cellular or fibrous tumours; neither are they grumous or pulpy; neither do they show a granular or fibrous structure on their cut or broken surfaces.

On section, the cut surfaces appear smooth, uniform, compact, shining, succulent with a yellowish, not a creamy, fluid. A peculiar appearance is commonly given to these tumours by the cut surface presenting blotches of dark or livid crimson, or of a brownish or a brighter blood-colour, or of a pale pink, or of all these tints mingled, on the greyish white or greenish basis-colour.[†] This is the character by which, I think, they may best be recognised with the naked eye, though there are diversities in the extent, and even in the existence, of the blotching. The tumour may be all pale, or have only a few points of ruddy blotching, or the cut surface may be nearly all suffused, or even the whole substance may have a dull modena or crimson tinge, like the ruddy colour of a heart, or that of the parenchyma of a spleen.[‡] The presence of cysts containing serous or bloody fluid may modify their appearance, but without obscuring their more essential characters; or, again, varieties may be connected with the locality of the tumour; such as, *e. g.*, that when they grow on or within bones, small osseous particles are commonly scattered through them.

However, among all these varieties, the fibro-plastic tumours are seldom difficult to recognize; they are as well marked as most of the species, and with microscopic help can very rarely be mistaken. The microscope shows that nearly the whole mass is composed of cells and other corpuscles, of which the following are the chief forms:—

1. Cells of oval, lanceolate, or angular shapes, or elongated and attenuated like fibro-cells or caudate cells, having dimly dotted contents with single nuclei and nucleoli.

2. Free nuclei, such as may have escaped from the cells; and among these, some that appear enlarged and elliptical, or variously angular, or elongated towards the same shapes as the lanceolate and caudate cells.

3. As the most peculiar form,—large, round, oval, or flask-shaped cells, from $\frac{1}{300}$ to $\frac{1}{1000}$ of an inch in diameter, which contain from two to ten or more oval, clear, and nucleolated nuclei, imbedded in clear substance. These are "parent cells," or "brood cells," such as one may find sometimes in actively growing granulations, and such as exist among the essential structures of the thyroid gland.

All these forms of corpuscles lie indiscriminately placed in a dimly granular substance, with abundant granular matter and free nuclei; or else, a material thus composed is traversed by filaments, and bundles of fibro-cellular tissue, and blood-vessels.

Such are the microscopic characters of the fibro-plastic tumours, and these as sufficiently distinguish them from all other innocent tumours, as their general aspects and histories do from the malignant ones.

Now, respecting the histories of fibro-plastic tumours, the cases hitherto observed are perhaps too few and too various to justify many general conclusions. The chief facts are, that these tumours usually occur singly, and most commonly in youth, or before old age, that they generally grow slowly and without pain, and that they occur without any known cause, such as injury or hereditary disposition. I do not know any degenerations to which they may be prone, and their permanently cellular forms show them to be less apt for development than for growth.

They have not usually any character of malignancy. Lebert's[*] opinion is very decided on this point; and it is confirmed by some of the cases I have watched.* Thus, a lad, eighteen years old, was under Mr. Stanley's care, four years ago, with a tumour occupying the interior of the symphysis, and immediately adjacent parts, of his lower jaw-bone. It had been observed gradually increasing for eight months without pain, and in its growth had disparted the walls of the jaw, hollowing out a cavity for itself, and projecting into the mouth through one of the alveoli. Mr. Stanley removed the portion of the jaw, from the first left molar to the first right bicuspid tooth, and the tumour presented the greenish and greyish basis, blotched with crimson and various brownish tints, and the characters of firmness, succulency, and microscopic texture, which I have described, as most distinctive of the fibro-plastic tumours. It was the specimen from which some of the microscopic sketches were made, and might be considered typical. This patient is still in good health, with no appearance of return of the disease.

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[*] I have already said that all the aural polypi I have been able to examine were of simple fibro-cellular texture: perhaps they may acquire a fibro-plastic character from lymph effused in inflammation.

[†] Lebert says the greenish-yellow colour that they may show depends on a peculiar sort of fat, which he calls Xanthine (Abhandl. 127).

[‡] I believe that many of what have been named spleen-like tumours of the jaws have been of this kind. The colour they present is not due only to blood in them; more of it is appropriate to their texture, as that of the spleen is or that of granulations.

[*] L. c. Unfortunately M. Lebert has rarely been able to extend his cases beyond the time of the recovery from the operation. Among his cases, No. 6 in the "Physiologie Pathologique," T. ii. p. 138, is the only one of certain fibro-plastic tumour in which the patient was observed long after its removal: in this case the patient remained well for at least six years.

Mr. Lawrence lately had under care a woman, twenty-one years old, with a tumour in the alveolar part of the front of the upper jaw. This was of about twelve months duration. It was seated between the walls of the alveolar and adjacent portion of the upper jaw, projecting slightly into both the mouth and the cavity of the nose. After cutting away the front wall of the jaw, the tumour was cleared out from all the cavity in which it lay imbedded. It was in all microscopic characters like that last mentioned, and resembled it in general features, except in that it had in every part the dark ruddy colour of a strong heart. The operation was performed seven months ago, and there has been no reappearance of the disease, such as would probably have occurred even before this in the case of a malignant tumour, if an attempt had been made to remove it, without the bone in which it was growing.†

But I believe we must not yet accept the rule, exemplified by these and similar cases, as free from exceptions; for I have seen two cases of what, at present, I must believe to be the same form of tumour, that had a very different issue.

A woman, fifty years old, was under Mr. Stanley's care, in 1847, with an irregular, roundish, heavy tumour in her left breast, between two and three inches in diameter. It projected in the breast, and the skin over it was red and tense, and at one part seemed to point, as if with suppuration. Some axillary glands were enlarged, but not hardened.

This tumour had existed about nine months, had been the seat of occasional pain, and was increasing. It was considerd to be hard cancer; but, on removal of the breast, was found to be a distinct growth, completely separable from the mammary gland, which was pressed aside by it. Its character was obscured by suppuration in many points of its substance; yet after a careful examination of it in the recent state, and a repeated examination of the notes and sketches that I made of its structure, I can only conclude that it was a fibro-plastic tumour suppurated.

Eighteen months after the removal of her breast, this patient returned to the hospital, with a large ulcerated tumour in the lower part of her left axilla, which had begun to form as a distinct tumour six months after the operation. This was like a large flat ulcerated cancer: it often bled freely. Her general health was deeply affected by it, and she died in two or three months after her readmission.

The malignant character manifested in this case was yet more decidedly marked in another. A man, fifty-three years old, of healthy appearance, was under Mr. Lawrence's care with an oval tumour, extending, under the mastoid muscle, from the angle of the jaw to the clavicle. Bloody serum oozed from it through three small apertures in the integuments. The anterior part of the tumour felt as if containing fluid; the posterior part felt solid, firm, and elastic. He had observed this tumour for ten months, having found one morning, when he awoke, a lump nearly as large as an egg, which regularly increased. In two months it had become very large: it was punctured, and about one-third of a pint of reddish serum was discharged from it. In the succeeding eight months it was tapped thirty-four times more, about the same quantity of similar fluid being each time evacuated. It was also six times injected with tincture of iodine, twice traversed with setons, and in various other ways severely treated. The only general result was, that it increased, and seemed to become, in proportion, more solid. When admitted under Mr. Lawrence, all the parts over the tumour were extremely tense and painful, and cerebral disturbance appeared to be produced by its pressure on the great blood-vessels of the neck. It was freely cut into, and the surface which was exposed presented well-marked characters of the fibro-plastic tumours such as I have described. Some small portions that were removed enabled me to confirm this with the microscope. The fibro-plastic elongated, and the many-nucleated cells, were, to all appearance, decisive. The incision of the tumour produced temporary relief; but the tumour continued to grow, and death occurred nearly twelve months from its commencement. In examination after death, the solid portion of the tumour formed five-sixths of its bulk, the rest consisting of a suppurating cavity. The microscopic characters of the solid part were exactly like those of the portions removed during life, though the substance appeared firmer and whiter than before, and yielded, when scraped, a creamy fluid. Four small masses of similar substance were found in the lungs; and a similar material was diffused in one cervical gland.

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* Some of the growths included under the name are difficult to remove entire, and some are so placed that the surgeon is often tempted to leave portions of them. So a fibro-plastic epulis or aural polypus may grow again after an operation, but this may be only because the removal was incomplete. When the whole disease is removed recurrence is certainly unusual in either of these diseases.

† Mr. Lawrence has, at this time, under treatment a young woman in whom both upper jaws have been the seats of fibro-plastic tumours. He has lately removed one of the tumours, with the greater part of the right upper jaw bone; the other tumour appears subsiding; and, whatever may be the issue of the case, the whole of its recent progress has been very unlike that of a malignant disease.

Now, in both these cases, and especially in the last, the whole history of which seems full of anomalies, there were certainly such features of dissimilarity from the usual general characters of the fibro-plastic tumours, that, although the microscopic characters appeared identical, yet they are not enough to prove even the occasional malignancy of the disease: but they are enough to make us cautious—enough to induce us to study this disease very carefully, as one of those that may, in different conditions, or in different persons, pursue very different courses,—appearing in some innocent, in others malignant. The use of such terms as "semi-malignant," "locally malignant," "less malignant than cancer," and the like, in relation to growths of this kind, involves subjects of singular interest in pathology, as well as in practical surgery; but at present it may be well to form no conclusive opinion upon them. I can scarcely doubt that certain tumours, presenting, in all apparent structure, the same characters, may, in different persons, appear "innocent" or "malignant:" but respecting the grounds of these differences, I can as yet scarcely offer a suggestion.* At present I would rather doubt than adopt any general conclusion on the questions herein involved.

Doubts such as I have just expressed exist, also, with peculiar force, in relation to the two groups of tumours to which the remainder of this lecture must be devoted.

For one group, the name of "RECURRING FIBROID TUMOURS" may, for the present, suffice: their chief characteristics being that their general aspect very closely resembles that of the common fibrous tumours, their microscopic structure is in many respects like that of the fibro-plastic tumours, and the most striking feature in their history is their proneness to return after removal.

A brief account of some cases of this tumour may best illustrate it. The first I saw was from a gentleman, sixty years old, under the care of Mr. Stanley. In 1846 a tumour was removed by Mr. Cockle from the upper and outer part of his leg. It lay close to the tibia, was as large as a filbert, and was considered fibrous. Some months afterwards, another tumour was found in the same place, and when as large as a walnut, was removed by Mr. Hamilton, of the London Hospital, who considered it "decidedly fibrous." In October 1847, Mr. Stanley removed from the same place a third tumour; and this I examined minutely. It had the shape, and nearly the size, of a patella; and the note that I made of its general appearance was, that it was "very like those fibrous tumours which are whitest, most homogeneous, and least fasciculate and glistening;" and that "without the microscope I should certainly have called it a fibrous tumour."

The microscopic examination, however, shewed peculiar structures. The tumour was composed almost entirely of very narrow, elongated, caudate, and oat-shaped nucleated cells, many of which had long and subdivided terminal processes. Their contents were dimly shaded; and in many instances the nuclei appeared to swell out the body of the cell, as in the most elongated granulation-cells, or fibro-plastic cells. With these cells were scattered free nuclei, and grumous or granular mattter, such as might have been derived from disintegrated cells. Very little filamentous tissue was contained in any part of the tumour.

Now, in the extirpation of the third tumour, the parts around it were very freely removed, the periosteum was scraped from the tibia, and every assurance seemed to exist that the whole disease was cleared away. But in June, 1848, two small tumours appeared in the subcutaneous tissue, just below the seats of the former operations. These also were removed, and these had the same fibrous appearance, and the same minute texture, as the preceding. Some months only elapsed before in the same place another tumour grew; *i. e.* a sixth tumour. The patient despairing of remedy by operations, allowed this to grow till last November, by which time it had acquired a diameter of between four and five inches, and protruded as a large soft fungous mass from the front of the leg. Two profuse hæmorrhages occurred from it, and made him earnestly beg that his limb might be removed to relieve him from the extreme misery of his disease. The amputation was performed, and he died in a few days.

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* Only, I think I have known cases making it probable, that the children of a cancerous parent may be the subjects of tumours which may be like innocent tumours (such as the mammary glandular) in their structure, but may resemble cancers in a peculiar rapidity of growth, a proneness to ulceration and hæmorrhage, and an aptness to return after removal.

The tumour removed with the leg appeared confused with thin skin over it. It rested below on the muscles of the leg, but was not mixed with them except at a scar from the former operations. The tumour was milk-white, soft, and brain-like, except where discoloured by effused blood, and in the exposed parts was soft, pulpy, and grumous. One would certainly, judging by its general aspect, have called this a brain-like medullary cancer; and yet it had essentially the same microscopic characters as the tumours I first examined from the same patient, only, the narrow, elongated, caudate cells were very generally filled with minute shining molecules, as if from fatty degeneration connected with the protrusion and partial sloughing of the mass. Unfortunately no examination of the body was made after death, and it could only be guessed, from the absence of emaciation, and of all other indication of general loss of health, that no similar disease existed in internal organs.

In another case of the same kind, I assisted Mr. Stanley, in May, 1848, in the removal of a tumour from the shoulder of a gentleman, 28 years old. It had been growing under the deltoid for six months, was loosely connected with the surrounding parts, and was about three inches in diameter. It had the general aspect of a common fibrous tumour; firm, tough, white, traversed with irregular bands. It was easily and completely removed, but was not examined with the microscope. The wound of the operation healed well; but, two months afterwards, a second tumour appeared under the cicatix. This was removed with some of the adjacent muscles, and other tissues. It was like the first, only less tough, and more lobed, and elastic; but under the microscope, instead of appearing fibrous, it appeared composed almost entirely of elongated and caudate nucleated cells, very like those described in the last case, and mixed with free nuclei, and granular matter.

In March, 1849, a third tumour was removed from the same part, which had been noticed two months, and again presented the same character; it was indeed greyer, and less firm, and more shining and succulent on its cut surfaces, but the differences to the naked eye were not great, and the microscopic structure was the very same as in the former instance.

In October, 1849, another tumour had formed, and after it had resisted various methods of treatment, Mr. Stanley removed this also, by a fourth operation, in December. It had again the same character.

In the course of 1850, a fifth tumour appeared in the same part, and when I saw the patient a few months ago, this remained growing slowly, but not in any way interfering with his general health. He was pursuing an active occupation, and, but for the tumour, might have been thought a healthy man.

Prof. Gluge* has given a good general account of the history of such tumours as these, as examples of the forms transitional to cancer. He names them "albuminous sarcoma;" a term one hears frequently used, without perhaps, any clear meaning, yet generally, I think, with the suspicion that the growths to which it is applied are not wholly innocent.† Among the cases which he cites, one coincides exactly with those I have detailed. A Major, 45 years old, fell from his horse, in 1843. Six or seven weeks afterwards, a tumour appeared over his scapula. It was removed, but after some months returned. Between 1843 and 1848, four such tumours were removed from the same part. In 1848, the patient was under the care of M. Seutin, who removed the fifth tumour, and Gluge's description of this, including the expression that in colour and consistence it was like the muscular tissue of the intestinal canal, leaves little doubt that it was like the less firm of the specimens that I have been describing. In the last of these five operations, and in one previously, the removal of the tumour was followed by free cauterization of the wound; yet the last account published by Professor Gluge, was that in April, 1849, a sixth tumour had appeared in the same part: and he has informed me by letter, that in 1850 the patient died.‡

It will be observed, that in all these cases, recurrence is the only feature in the history of the disease making it resemble the malignant growths. And a case by Dr. Douglas Maclagan, the most instructive of all that have been recorded, proves that this tendency to recurrence may at length cease. The case is related in the 48th volume of the Edinburgh Medical and Surgical Journal, and by Dr. Maclagan's extreme kindness I am enabled to illustrate it with finished drawings of the tumours removed in the successive operation.

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* Pathol. Histologie, p. 49.

† What Müller (On Cancer, p. 19) refers to as examples of benignant albuminous sarcoma were probably examples of the fibro-plastic tumour.

‡ Gluge cites three other cases; but I am not quite sure that they were of this kind.

A girl, 22 years old, had a tumour, of three years growth, on the left lumbar region about an inch from the spine. In 1832, it was about as large as a Jarganelle pear, firm, but elastic and moveable, and below it was a portion of indurated skin. The tumour and diseased skin were removed, and the former "possessed most of the characters of a simple fibrous tumour." After about twelve months the disease returned in the scar. Three little tumours formed, and these with the scar were removed freely, in February, 1834. "The extirpated mass bore a striking resemblance to that previously removed." Between twelve and eighteen months later a third growth appeared; which, after increasing for a year and a half, was removed. "It had the same elastic feel and fibrous appearance; and the semitransparent pinkish grey colour was the same as in the original tumour." After this operation no fresh growth ensued, and Dr. Maclagan informs me that the patient remains perfectly well.

Mr. Maclagan has added the account of another case in which the essential features were quite similar; and to these I might add others. One was described by Mr. Syme, at a meeting of the Edinburgh Medico-Chirurgical Society,* in which three similar tumours were in nine years removed from a patient 64 years old. Another, which I believe must be referred to this group, is accurately described and figured by Dr. Hughes Bennett.† But the references to these, and the accounts that I have given of other cases, may suffice to prove the existence of a group of tumours having these remarkable characters in common:—1st. A general resemblance to the fibrous tumours in their obvious characters; 2d. A microscopic texture resembling that of the fibro-plastic more than of any other tumour, yet differing in the absence of the many-nucleated cells; 3d. A tendency to local recurrence after removal, and, in the worst extremity, to protrusion and ulceration, like a malignant growth;‡ 4th. An absence of those events which, in cases of ordinary malignant growths, would coincide with this local recurrence, such as cachexia, and the affection of distant parts, or of the lymphatics.

How may we interpret their singular proneness to recur? Two views may be taken of the facts.* The tumours may, from the first, be formed of a cluster or group, and then the removal of one of them only leaves the remainder to continue their growth; or, 2dly, the apparent recurrence may be a real one, such as we suppose occurs in the case of cancers; in which we presume that, in a first operation, every morbid structure already formed in a part is removed, and entirely new growths are produced in the same part.

The former view is supported by whatever of resemblance exists between these and fibrous tumours, whose proneness to multiplicity is remarkable; and by the fact that sometimes, after the removal of one of these, two, or a more numerous group, have appeared in the same part. Yet the objections to this view appear to me more weighty. If we suppose, in any case in which six or seven tumours have been removed in succession from the same part, in as many years, that all began to grow at or about the same time, the last of these ought, according to the rate of growth of the rest, to have come into view much sooner. If the second tumour were not discernible in the first operation, where, or of what size, was the sixth?—or why did it require six or more years to come to the same bulk as the supposed coeval second tumour acquired in one year? It may be added that some of these tumours appear to have recurred in the substance of a scar left after a former operation—in a tissue, therefore, which did not exist at the time of the previous operations. Nor must we overlook, in connection with this apparent aptness to recur, the fact that the later-formed of these tumours may assume certain characters of the thoroughly malignant growths which were not observed in the earlier. In one of the cases I have seen, the last tumour was, in general aspect, hardly to be distinguished from brain-like tumour, though, in microscopic characters, essentially like its predecessors. In one of Professor Gluge's cases, the transitions to completely malignant characters appeared yet more sure. Mr. Syme also expresses a similar transition; describing, as the usual course of these cases, that, after one or two recurrences of the tumour, the next new productions present a degeneration of character, excite pain, proceed to fungous ulceration, and thus in the end prove fatal. So that, although there be cases in which this evil career has not been run, yet I think we may regard these tumours as approximating to characters of malignancy, not only in their proneness to recur after removal, but in their aptness to assume sometimes the more malignant features the more often they recur. Whatever be the truth concerning the supposed transformation of an innocent into a malignant morbid structure, I think it cannot be doubted that, in the cases of some recurring growths, the successively later growths acquire more and more of the characters of thoroughly malignant disease.*

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* Monthly Journal of Medical Science, vol. ii. p. 194. The report states that Professor Bennett found the microscopic characters of this tumour similar to those of the fibro-plastic tumours of Lebert. Probably this refers to the elongated cells alone. I have not, in any of these tumours, found the large many-nucleated cells which occur in the fibro-plastic tumours.

† On Cancerous and Cancroid Crowths, p. 87.

‡ Mr. Syme particularly mentions this as a character belonging to those which he has seen. It looks, indeed, very like a sign of malignant disease; but it may be only another feature of general resemblance between these and the subcutaneous fibrous tumours mentioned in the earlier part of the lecture.

* Some would add a third, supposing that in all these cases portions of the tumour were left behind in the operations. But this is unreasonable. These tumours are not more difficult to remove wholly than many are which never thus recur, such as the fatty, fibro-cellular, and the like. Besides, in many of the cases I have cited, it is certain that the whole tumour was every time removed.

The second group of tumours, which, while bearing an apparent relation to the fibrous tumours, yet exhibit features of malignant nature, are those to which, till their characters are more perfectly known, I would give the name of MALIGNANT FIBROUS TUMOURS. In both general and microscopic characters they exactly resemble, I believe, the ordinary fibrous tumours already described; but they differ from them in that they recur once or more after removal, and form not only in their first locality, but in internal parts remote from it.

The most remarkable instance of the kind that I have seen was in a poor widow who was under my care ten years ago. She was 47 years old, and had been crippled with acute rheumatism for ten years before she found a small moveable tumour in her right breast. This had increased slowly till seven weeks before I saw her, when, having struck it, it began to grow very rapidly, and became the seat and centre of severe pain. It increased to between two and three inches in diameter, was nearly spherical, very firm, tense, and painful,—even extremely painful. I supposed it to be a large hard cancer, and removed the whole breast.

I found the tumour completely separable from the mammary gland, which was pushed aside by it, but was healthy: the cut surface could not, I think, have been distinguished from that of an ordinary fibrous tumour of the uterus, with undulating white bands, except in that part of it had a suffused purplish tinge.* The whole substance of the tumour had the same characters; and in microscopic examination, often and lately repeated, I could find nothing but tough, compact, well-formed, fibrous tissue, with imbedded elongated nuclei. On boiling, gelatine was freely yielded. In short, I believe it would be impossible to distinguish, by any means but the history, this tumour from a common unmixed fibrous tumour of the jaw or subcutaneous tissue.

Three months after the operation a tumour appeared under the scar. It grew very quickly, and felt just like the former tumour. After two months the thin scar began to ulcerate, and the integuments around sloughed; and shortly the whole of this tumour was separated by sloughing, and was removed entire. This also had and still retains every character of the common fibrous tumour.

After the separation of this second tumour, a huge cavity remained, with sloughing walls; then, as the sloughing cleared away, hard knots, like those of a cancerous ulcer, grew up from the walls, and the disease assumed all the characters of a vast and deep hard cancerous sore. In two months she died. I found the ulcer nearly a foot in diameter: its walls were formed of a thick nodulated layer of hard, whitish, vascular substance, like the firmest kinds of medullary cancer. Both lungs contained between twenty and thirty small masses of similar substance imbedded or infiltrated in their tissue;† and this substance I have recently again examined, and found to be a complete fibrous tissue, like that of the first tumour removed. I found no similar disease elsewhere.

All the characteristic features of malignant disease were thus superadded to the growth of a tumour which appeared to be, in every structural character, identical with the common innocent fibrous tumour. Nearly the same events were observed in the following case:—In 1835, a man was in St. Bartholomew's Hospital, under the care of Mr. Earle, with a large spheroidal tumour, lying by the base of his scapula, and extending beneath it. It was removed; and I remember that it was easily enucleated from the adjacent parts, and was called "albuminous sarcoma;" but it was not preserved. About a year afterwards he returned with a yet larger tumour in the same situation. Mr. Skey removed this, together with a large portion of the scapula, to both surfaces of which it was closely united. The wound was scarcely healed, when another tumour appeared, and increased rapidly. With this the patient died, and growths of similar substance, white, very firm, and nodulated, were found beneath that part of the pleura which corresponded with the growth on the exterior of the chest. I state these particulars from memory; but I have found, from repeated recent examinations, that the tumour removed by Mr. Skey is of fibrous texture, resembling the common fibrous tumours both in general and in microscopic characters, and, like them, yielding gelatine when boiled.* It is lobed, with partitions of fibro-cellular tissue, and its several lobes are intersected with obscure opaque white fibres: it is tough, compact, and heavy, and tears with an obscure fibrous grain. It is easily dissected for the microscope, tearing into fasciculi, and appears composed wholly of closely-placed and nearly parallel undulating filaments. A few shrivelled nuclei appear among the fibres, but no cells are distinguishable.

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* Compare some of the cases next described; some also of those of recurring proliferous cysts in the breast; and a remarkable case, of which specimens are described in the Catalogue of the Museum of St. Bartholomew's, ser. 35, Nos. 28, 29.

* See museum of St. Bartholomew's, ser. 34, Nos. 24 and 25; and Museum Coll. Surg. No. 224.

† Mus. St. Bartholomew's, 14; 43, Mus. Coll. Surg.

To these cases I may add, though it be an imperfect one, that of a woman from whose back Mr. Lawrence removed a large, well-marked fibrous tumour, which had grown nine months after one of the same appearance had been removed from the same part.* Before removal, this was judged by all who saw it to be malignant; but it presented a genuine fibrous structure, and could not, I think, be distinguished from an ordinary fibrous tumour.

Such are the cases which make me believe that tumours occur, resembling in all respects of structure and chemical composition the fibrous tumours of the uterus (excepting their muscular fibres), or of the bones or subcutaneous tissue, yet differing from these in that they pursue a course like that of cancers, recurring after removal, growing at the same time in internal organs, tending to sloughing or ulceration, and in these processes involving adjacent structures. I have related only cases in which the fibrous structure was proved by microscopic examination; but I have little doubt that others might be added from the cases of tumours of the jaws and other bones, believed, from their general appearance, to be fibrous, yet pursuing a malignant course. I will only add that these are not such growths as those which Müller and others have named Carcinoma fibrosum, and which, I believe, are always infiltrations in the substance of the affected organs, including cancer-cells with their fibrous tissue, and having in this tissue such hardness, stiffness, and other peculiarities of structure, as make it easily distinguishable from the normal fibrous tissue and its imitation in the fibrous tumours.

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* It is in the Museum of St. Bartholomew's, Series xxxv., No. 51.

* Mus. St. Bartholomew's, Ser. xxxv., lii.

LECTURE VI.

Cartilaginous tumours.—General characters and relations, when growing in soft parts, and on or in bones—Microscopic structure—its peculiar diversity, in regard to the basis-substance, cells, and nuclei, in different specimens—deductions respecting "homology" of structure, considered as an indication of the nature of a tumour—their rates of growth—development—degenerations and defects—diseases—varieties of appearance hence derived.

Particular illustrations of cartilaginous tumours connected with the several bones of the limbs, jaws, cranium, spine, and hands, and with the salivary glands—their general nature—occasional recurrence—frequent combination with medullary cancer, and with glandular, fibro-cellular, fibro-plastic, and other growths.

THE name of cartilaginous tumours may be given to those which Müller, in one of the most elaborate portions of his work on Cancer, has named Enchondroma.* Either term will sufficiently imply that the growth is formed mainly of a tissue like cartilage; and I would at once point out the singularity of such tumours being formed, and growing to so great a size as I shall have to describe, although cartilage is not formed for the repair of its own injuries, nor, at least in man, in a perfect manner, for the repair of the injuries of bone.

The cartilaginous tumours are found, in the large majority of cases, connected with the bones and joints.† However, they occur not rarely in soft parts, completely detached from bone. Thus, in the pure form, or mixed with other tissues, they are met with in the testicle,‡ mammary gland,§ subcutaneous tissue,* and lungs,† and in the soft parts near bones; but among all the soft parts their favourite seat appears to be the neighbourhood of the parotid gland. The greater part of the solid tumours formed in this part have more or less of cartilage in them.

Cartilaginous tumours that are connected with bones may occur in two distinct positions—namely, within the walls, or between the walls and the periosteum: very rarely, they grow in both these positions at once. When they are within the bones they are isolated and discontinuous, and are surrounded by the walls, which may be extended in a thin shell or capsule of bone around them, or may be wasted and perforated by them. When they grow outside the bones they are generally fastened to the subjacent bone-wall by outgrowths of new bone; the periosteum, greatly overgrown, invests them, and prolongations from it towards the bone appear to intersect them and divide them into lobes. When they grow among soft parts they have a well-formed fibro-cellular or tougher fibrous capsule, which is commonly more dry and glistening than that of most innocent tumours.

In any of these situations, cartilaginous tumours may be either simple or complex, conglobate or conglomerate, if we may adopt such terms; *i. e.*, they may be composed of a single mass without visible partitions, or of numerous masses or knots clustered, and held together by their several investments of fibro-cellular tissue. According to these conditions, they present a less or more knotted or knobbed surface; but in either state they affect the broadly oval or spheroidal shape.

To the touch, cartilaginous tumours may be very firm or hard, especially when they are not nodular and their bases are ossified. In other cases, though firm, they are compressible, and extremely elastic, feeling like thick-walled tensely-filled sacs. Many a solid cartilaginous tumour has been punctured in the expectation that it would prove a cyst.

The knife cuts them crisply and smoothly, and their cut surfaces present, in the best examples, the characters of fœtal cartilage, —bright, translucent, greyish-, or bluish-, or pinkish-white, compact, uniform. Usually each separate mass or lobe is without appearance of fibrous or other compound structure; but sometimes the cartilage looks coarsely granular, as if it were made up of clustered granules. This is, I think, especially the case in the inclosed cartilaginous tumours of the hands and fingers, especially in such of them as are soft. In other cases, when the cartilage is very firm, it may be opaque or milk-white.

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* Other names employed are Osteo-chondroma, Chondroma, Benign Osteo-sarcoma. The term osteo-sarcoma cannot be too entirely disused; it has been more vague than even Sarcoma, having been employed indiscriminately for all tumours, of whatever nature, growing in or upon bones, provided only they were not entirely osseous.

† Those referred to as connected with the joints are the cartilaginous masses that are found pendulous or loose in joints. They have sufficient characters in common with these tumours to justify their enumeration in this list; yet they are in so many respects peculiar, that they would need a separate history.

‡ Mus. Coll. Surg., Nos. 2384-5-6; Mus. St. Bartholomew's Hosp. ser. 28, No. 17, and Appendix; and several in the Museum of St. Thomas's Hospital. See also Mr. Gamjee's Pamphlet, On a case of Ossifying Enchondroma in the Testicle of the Horse.

§ Astley Cooper, Diseases of the Breast, p. 64; Müller, On Cancer, p. 149, No. 13, from a dog; Mus. St. Bartholomew's, ser. 34, No. 13, from a bitch.

* Rokitansky, Pathol. Anat., B. i. p. 261; Lebert, Abhandlungen, p. 195.

† Mus. St. Bartholomew's, Pathol. Appendix; Rokitansky and Lebert, l. c.

In different examples of cartilaginous tumour there are great varieties of consistence or firmness. Some appear almost diffluent, or like vitreous humour; some are like the firmest fœtal cartilage; but, with the exception of the cartilaginous growths that are pendulous or loose in joints, I have never seen any present such hardness, dulness, or yellowness, as do the natural adult cartilages of the joints, ribs, or larynx.

As, in all appearance, the material of these tumours, in its usual and most normal conditions, is identical with fœtal cartilage, so is it, I believe, in its development, and, as Müller has shown, in its chemical characters.[*] The microscopic characters, also, of cartilaginous tumours agree, speaking generally, with those of fœtal cartilage; yet there are several particulars to be observed concerning them, and especially the diversity of form and arrangement that may be seen in the microscopic constituents of even different parts of the same tumour.

This diversity of microscopic forms is enough to baffle any attempt to describe them briefly, or to associate them with any corresponding external characters in the tumours. The most diverse forms may even be seen side by side in the field of the microscope. But this diversity is important. It has its parallel, so far as I know, in no other innocent tumour; and the cartilaginous tumours form the single exception to a very generally true rule enunciated by Bruch[†] — namely, that it is a characteristic of the malignant tumours, and a distinction between them and the innocent, that they present, even in one part, a multiformity of elementary shapes.

The diversity of microscopic characters extends to every constituent structure of the cartilage in the tumours. I will state the general and chief results of the examinations of fifteen recent specimens of which I have lately made notes and drawings.[*]

(*a.*) In regard, then, to the basis or inter-cellular substance—(1) It is variable in quantity, the cells or nuclei lying in some specimens wide apart, in some being closely crowded; (2) it varies in consistence with all the gradations to which I have already referred; (3) and in texture, in some specimens it is pellucid, hyaline, scarcely visible; in some dim, like glass breathed-on; in many more it is fibrous in texture or in appearance: indeed, most cartilaginous tumours might deserve to be called fibro-cartilaginous. It is seldom, and, I think, only in the firmest parts or specimens, that the substance between the cartilage-cells has the strong hard-lined fibrous texture which belongs to the chief natural fibrous cartilages; yet it has generally a fibrous texture. The fibres are, or appear, usually soft, nearly pellucid, and very delicate; sometimes they appear tufted or fasciculate; sometimes they encircle spaces that contain each a large cartilage-cell, or a cluster of cells or nuclei; sometimes they form a fasciculated tissue in which cartilage-cells lie elongated and imbedded: most commonly of all, I think, they curve among the cells, as if they were derived from a fibrous transformation of an intercellular hyaline substance.

(*b.*) Yet greater varieties may be found in the characters of the cartilage-cells.[†] (1) In plan of arrangement they may be irregularly and widely scattered, or closely placed, or almost regularly clustered with fibrous tissue encircling them. (2) In individual cells there are varieties of size from $\frac{1}{700}$th to $\frac{1}{1500}$th of an inch. (3) And there are yet more varieties of shape; some have the typical form of healthy preparatory cartilage-cells, being large, round, or oval, or variously shaped through mutual pressure, faintly outlined, with single nuclei, and clear contents; and some are like normal compound cartilage-cells. (4) But, with various deviations from these more normal characters, some cells have hard dark outlines; and some are bounded by two, three, or four dotted or marked concentric circles, as if the cell-walls had become laminated; others appear without any defined cell-walls, as if they were mere cavities hollowed out in the basis-substance; and, in other instances, the cell-walls and their contents, down to the nucleus, appear as if they were completely fused with the basis-substance, so that the nuclei alone appear to be imbedded in the hyaline or dimly fibrous material. These last two states appear to be connected with very imperfect development or with degeneration; for I have seen them, I think, in only very soft cartilage, or in such as showed other distinct signs of degeneration. In many such cases, also, the nuclei are so loosely connected with the basis-substance, that large numbers of them float free in the field of the microscope.

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[*] The enchondromata of bones, he says, always yield chondrin; while those of soft parts may yield either gelatine or chondrin (On Cancer, p. 124). The whole account of their analyses is very ample.

[†] Die Diagnose der bösartige Geschwülste.

[*] These are exclusive of specimens of loose cartilages in joints; of which, indeed, no account will be given in this lecture.

[†] I retain this name, although the observations of Bergmann (De Cartilaginibus, 1850) and others show that it is difficult in some cases to determine the nature of the *cell-contents*, and that they may resemble cells rather than nuclei. Taking as the type of cartilage-*cells* the elements of the chorda dorsalis, I think we shall least often err, if we keep the term *cell* for those elementary structures in other cartilages which are most like the cells of the chorda, in their fine clear outline and the pellucid or dim space just within, or, also, just without it.

(*c*) The varieties of the nuclei in the cartilage of tumours are not less than those of the cells. (1). Some are like those of the normal cartilage—round or oval, clear, distinctly outlined, with one or two nucleoli. (2). But some appear wrinkled or collapsed, as if shrivelled; some contain numerous minute oil-particles, representing all the stages to complete fatty degeneration, and the formation of granular bodies; some are uniformly but palely granular, like large pale corpuscles of lymph or blood; some are yet larger, nearly filling the cells, pellucid, like large clear vesicles with one or more oil-particles enclosed; and some have irregularities of outline, which are the first in a series of gradational forms, at the other extremity of which are various stellate or spicate corpuscles.

Now I have not been able to discern any constant rule of coincidence between any one of these forms of nuclei and any of the forms of cells, nor between either and any of the enumerated appearances of the intercellular or basis-substance. All modes of combinations have appeared among them; only, on the whole, the completely developed cells have the best nuclei, and the degenerate or imperfect of both are usually in company.

The last-named nuclei, with irregular outlines, deserve a more particular description, both because they are, so far as I know, found in no normal cartilage in any of the vertebrata, and because their imitating, in some measure, the forms of bone-corpuscles might wrongly suggest that they have an important or a constant relation to the ossifying process.

They were first described, I think, by Müller; and have since been noticed in cartilaginous tumours by Mr. Quekett, and many others. I have examined them in six cases; and, to show that they are not peculiar to one form of cartilaginous tumour, I may add that, of these six, one was a great tumour encircling the upper part of the tibia, one a growth on the last phalanx of the great toe, one a mixed tumour in the articular end of the fibula, and three were mixed tumours over the parotid or submaxillary gland.

The phases of the transformation by which they are produced appear to be, that a nucleus of ordinary form, or with one or more oil-particles, extends itself in one or several slender, hollow, and crooked processes, which diverge, and sometimes branch as they diverge, towards the circumference of the cell. Such nuclei may be found within the cells, or within cavities representing cells whose walls are fused with the intercellular substance; but much more commonly, it appears as if, while the nuclei changed their forms, the cells and the rest of their contents were completely fused with the intercellular or basis-substance, so that the nuclei alone appear imbedded in the hyaline or pale fibrous substance. Moreover, although, at first, as we may suppose, the nuclei, as they send out their processes, may retain the round or oval form of their central parts or bodies, yet they afterwards lengthen and attenuate themselves, so as to imitate very closely the shapes of large bone-corpuscles; or they elongate and branch, or shrivel up; and in these states, lying in groups, they have the most fantastic appearances. In these various states the nuclei are often only loosely connected with the basis-substance; so that they are easily removed from it, or are found floating on the field of the microscope.

Now, as I have said, corpuscles like these occur in no normal cartilage yet examined in man or any of the vertebrata. If, then, heterology of structure were indicative of malignancy, the tumours that contain these corpuscles should certainly be malignant; but there is no single fact to make it probable that they are so, and every presumption is in favour of their being all as innocent as the tumour on the great toe in which I found them.

The only natural cartilage yet known as possessing these corpuscles is, I believe, that of the cuttle-fish; and it is at least interesting, and it may be importantly suggestive, to observe that the morbid structure, deviating from all that is natural in its own species, conforms with that of a much lower creature.

As to the meaning of these changes of the nucleus,—some like these may be preparatory to ossification, and the metamorphosis of the cartilage-nucleus into a bone-corpuscle; but I believe all I have myself examined were degenerations without reference to ossification. We may believe the nuclei to be changed by a process of degeneration on many grounds; such as (*a*) the fact already mentioned of their likeness to the nuclei of lower cartilages; (*b*) their likeness in shape to ramified pigment-cells and bone-corpuscles which have probably lost all power for their own nutrition; (*c*) the frequent coincidence of more or less fatty degeneration in the nuclei thus changing; (*d*) the usual coincidence of the fusion of the cell-wall and contents with the basis-substance of the cartilage, and the loosening of the nuclei; (*e*) the gradual shrivelling or wasting of the nuclei after the assumption of the stellate form.*

Such is the anatomy of cartilaginous tumours; and now, in relation to their physiology, several points may deserve notice.

Their rate of growth is singularly uncertain. They may increase very slowly. I have seen one not more than half an inch long which had been at least four years in progress. Or, after a certain period of increase, they may become stationary; as often happens in the tumours that occur in large numbers on the hands. Or, from beginning to end, their growth may be very rapid. I remember a man, about 40 years old, in St. Bartholomew's Hospital, in whom, within three months of his first noticing it, a cartilaginous tumour increased to such an extent that it appeared to occupy nearly the whole length of his thigh, and was as large round as my chest. He had a pale unhealthy aspect, and suffered much from the growth; and its size and rapid growth, the tension nearly to ulceration of the skin over it, the enlarged veins, and loss of health, made all suppose it was a great malignant tumour. Mr. Vincent, therefore, decided against amputation of the limb, and the patient died exhausted within six months of the appearance of the disease. The examination after death proved that a great cartilaginous tumour, with no appearance of malignant disease, had grown within and around the middle two-thirds of the femur. The bone, after extension by the growth within it, had been broken, and all the central part of the tumour was soft, nearly liquid, and mixed with fluid blood and decolourised blood-clots.

In another case, lately under Mr. Lloyd's care, a cartilaginous tumour surrounding the upper two-thirds of a girl's tibia grew to a circumference of two feet in about 18 months. Gluge* also mentions a case in which, in a boy 14 years old, a cartilaginous tumour on a tibia grew in 3½ months to the size of a child's head, and protruded, and caused such pain and hectic, that amputation was necessary.

I need only refer to the importance of these cases in their bearing on the diagnosis of tumours, and as exceptions to the general rule that the malignant grow more rapidly than the innocent.

In extent of growth, the cartilaginous tumours scarcely fall short of the fibrous. Mr. Frogley† has related two cases of tumours of enormous size. In one, the patient was a young woman 28 years old, and the tumour, of nearly five years' growth, around the shaft of the femur, extended from the knee-joint to within an inch of the trochanters, and measured nearly three feet in circumference. It is a pure cartilaginous tumour, but its whole central part is soft or liquid, and many of the nodules of which it is composed have the character rather of cysts, through such central softening as I shall presently have to describe. The limb was removed near the hip-joint, and the patient has remained in good health for seventeen years since.‡

In the other case, by Mr. Frogley, the patient was a lady 37 years old, and the tumour had been growing eleven years; it was 20½ inches in circumference, and exactly resembled that in the former case. The amputation of the limb was equally successful.

The tumour in Mr. Lloyd's case, to which I have just referred, measured 24 inches in circumference. But all these are surpassed by an instance related by Sir Philip Crampton, in which a tumour of this kind, surrounding the femur, and soft in all its central parts, measured no less than 6½ feet in its circumference.

The only change of cartilaginous tumours which can be spoken of as a development, is their *ossification*.

So far as the process is concerned it is, I believe, an imitation of the ossification of the natural cartilages; and Mr. Quekett has, I believe, observed in such tumours all the modes of ossification observed in normal bones, and even more than these; the diversities of modes of ossification seeming to be not less than those of the elemental forms of cartilage.

But the more general or larger method

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* Mr. Quekett has seen the ossifying process ensuing in the substance between the stellate nuclei, and gradually enclosing them, so that they assume the appearance of bone-corpuscles. I have not yet seen this; but his authority is sufficient for proof of the fact. The occurrence of ossification with characters of a process of degeneration is quite consistent with what is known of the histological relative positions of cartilage and bone: see Lectures on Repair, Lecture IV.

* Pathologische Anatomie, Lief. iv.

† Medico-Chirurgical Transactions, vol. xxvi.

‡ I have to thank Mr. Frogley for affording me this information, and Mr. Lane for an opportunity of exhibiting at the Lecture the remarkable specimen obtained by the operation.

of ossification must be observed. Ossification may ensue, I suppose, in any cartilaginous tumour; but it is rare or imperfect in those that grow within bones, and is yet more imperfect, and is like the deposit of amorphous calcareous matter, in those that lie over the parotid gland.* It is best seen in those that lie upon or surround the bones; and in these, two methods of ossification may be noticed.

In one method, the ossification begins at the surface of the bone, where the cartilaginous tumour rests on it, and thence the new-formed bone grows, or, as it were, shoots, into the cartilage. Thus, the ossification may make progress far into the substance of the cartilage; and the tumour may appear like an outgrowth of bone covered with a layer or outer crust of cartilage, on which the periosteum is applied. Or, extending yet further, the cartilage may by this method be wholly ossified, and the cartilaginous may be transformed into an osseous tumour.

In the other method of ossification, the new bone is formed in the mid-substance of the cartilage. In a large tumour this may commence at many points, and, from each extending, the several portions of new bone may coalesce with one another, and with that formed in the first method like an outgrowth from the surface of the original bone. Indeed, this twofold method of ossification is commonly seen in the large tumours that surround long bones.

The ossification ensuing in several points, and thence extending, is plainly, in these tumours, an imitation of the natural ossification of the skeleton from centres in each of its constituent parts. Sometimes, indeed, this natural process is imitated with singular exactness. Thus, we have here a portion of a large tumour which was taken from the front of the lumbar vertebræ of a soldier.† Half of it is cartilaginous, and half is medullary cancer. The cartilaginous portion consists of numerous small nodules, of various shapes, each of which is invested with a layer of fibro-cellular tissue, as its perichondrium. In many of these, a single small portion of yellow cancellous bone appears in the very centre, each nodule ossifying from a single nucleus or centre as orderly as each cartilage of the fœtal skeleton might ossify.

I shall speak in the next lecture of osseous tumours, and, among them, of those that are formed by these methods. It may therefore suffice, for the present, to say that, in nearly all cases, the bone formed in cartilaginous tumours consists of cancellous tissue, with marrow or medullary substance in its interspaces; and that when the ossification of the tumour is complete, the new cancellous tissue is usually invested with a thin compact layer or outer wall; and, if the tumour have grown on a bone, becomes continuous with the cancellous tissue of that bone.

The principal defect or degeneration noticeable in cartilaginous tumours is manifest in their being extremely soft, or even liquid,—a clear, yellow, jelly-like, or synovia-like material appearing in the place of cartilage. I call it a defect or a degeneration, because it is not always certain whether it is the result of cartilage, once well-formed, having become soft or liquid, or whether the soft or liquid material be a blastema which has failed of gaining the firmness and full organization of cartilage. The condition in which it is sometimes found can leave little doubt, I think, that it is often a degeneration,—a liquefaction of that which was once more perfectly nourished; but in other cases we have no guide to its interpretation, and it is quite probable that the same defective structure would be found in arrests of development as in degeneration.

But leaving this doubt, and passing to the mere description of these soft or softened cartilaginous tumours, I repeat that the soft material is like gradually melting, transparent, yellowish jelly, or like a gum-like substance, or like honey, or synovia, or serum. Such a material may occupy the whole interior of a cartilaginous tumour, one great cavity, filled with it, being found within a wall of solid substance.* Or the whole mass of a tumour†, or its exposed surface‡, may be thus soft or liquid. Often, too, we may trace in individual nodules of a cartilaginous tumour, a process of what I suppose to be central softening, by which, perhaps, the formation of the great central cavities of the large tumours is best illustrated. Thus, in the tumour of cartilage and medullary cancer, of which I have already spoken, as illustrating the process of ossification from a centre in each nodule, there are many nodules, in the centres of which, instead of bone, small cavities full of fluid are seen. So, too, in a large cartilaginous tumour, growing on the pelvic bones of a man 40 years old, a portion of which was sent to me by Mr. Donald Dalrymple, I found a large number of distinct nodules, each with a central cavity full of honey-like fluid: and the state of the cartilage around these cavities, its softness, the fusion of its cell-walls, and their contents, with its hyaline basis, and the sparing distribution of nuclei in it, make me believe that the softness and liquefaction were the results of a degenerative process*. It is often very difficult to say to what the softness or fluidity of these tumours is due. In some cases, it appears connected with their great bulk, and the hindrance to the sufficient penetration of blood to their central parts. Hence, it is, I think, proportionally more frequent in the large than in the smaller tumours. In some cases it may be due to exposure of the tumour, as in the instance of a great cartilaginous tumour which grew from the sacro-iliac symphysis and adjacent bones, and projected into the vagina of a woman 34 years old.† But in many more cases we are wholly unable to assign a reason for such softness.

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* Mus. Coll. Surg., No. 204.

† Mus. Coll. Surg., No. 217.

* As in Mr. Frogley's case; and as in many nodules of the tumours, No. 217 and others, in the Museum of the College of Surgeons.

† See a drawing of one in the hand, and a specimen in Ser. I. 115, in the Museum of St. Bartholomew's.

‡ Mus. Coll. Surg., No. 206.

The central softening of single nodules of cartilaginous tumours may extend to the formation of cysts ; for when the whole of a nodule is liquified, the fibro-cellular investment may remain like a cyst enclosing the liquid. This change is also shown in the same tumour as illustrates the central ossification and the central softening ; and it was not difficult to trace in it what appeared like gradations from central to complete liquefaction, and from a group of cartilaginous nodules to a group of cysts with tenacious fluid contents. It is to be added that the softened central parts of cartilaginous tumours are apt to be affected with rapid sloughing or suppuration. Such an event occurred in Sir Philip Crampton's case already quoted, and in one presenting many features of great interest which was lately under Mr. Lloyd's care at Saint Bartholomew's Hospital‡. A girl, 14 years old, was admitted with a very large tumour round the upper two-thirds of the tibia. It had been growing for 18 months, and, shortly before her admission, without any evident cause, the integuments over it began to look inflamed and dusky. The limb was amputated almost immediately after her admission, and the tumour presented in its interior a large cavity with uneven broken walls, filled with brownish serous fluid of horribly offensive putrid odour. The inner surface of the walls of the cavity appeared also putrid, and gases, the products of the decomposition, were diffused in the cellular tissue as far as the middle of the thigh.

Other changes of a degenerative character may be sometimes observed in cartilaginous tumours. Parts of them may appear grumous, or pulpy, and of an ochre yellow colour*. This is probably a fatty degeneration of their tissue. And, sometimes, as I have said, their ossification is so imperfect as to be more like a fatty and calcareous degeneration, in which their substance becomes like fresh mortar, or soft chalk, and is powdery, and white, and greasy†.

It may serve for additional illustration of this general pathology of cartilaginous tumours, if I describe now some particular forms of them.

I have said that they affect particularly the bones. The bones of the hands are their most frequent seats, and next to these, the adjacent extremities of the femur and tibia, the parts which, for some inexplicable reason, appear to have in all the skeleton the least power of resistance of disease. After these, the humerus, the last phalanx of the great toe, the pelvis, and the ribs, appear most liable to cartilaginous growths; and after these, the number of cases is as yet too small to assign an order of frequency, but there is scarcely a bone on which they have not been seen.

Of the cartilaginous tumours of the large long bones I need say little, having drawn from them the greater part of the general description. Only, the relations of the growths, according to the part of the bone in or near which they lie, may be worth notice.

When, then, the tumour grows at or about the articular end of a large long bone, it is almost always placed between the periosteum and the bone. Here it usually surrounds the bone, but not with an uniform thickness ; and the thin wall of the bone wastes and gradually disappears as if it were eroded, or as if it changed its form, becoming cancellous, and then growing into the tumour, as I have already described. I have never seen such a tumour encroaching on the articular surface of a bone. But it may grow up all about the borders of the joint and surround them. A striking example of these relations of the cartilaginous tumour to the bone on which it grows is in one of the finest specimens in the Museum,‡ a cartilaginous tumour of the humerus, removed in an amputation at the shoulder-joint by Mr. Liston. The patient was a Naval surgeon, and the tumour had been growing for nearly forty years. The mass it now forms is nearly ten inches across; it surrounds the upper three-fourths of the shaft of the humerus, and nearly surmounts its articular surface. The abundant isolated nodules, the partial central ossification and central softening, the growth of bone from the cancellous tissue of the humerus into the tumour,—all these, and many other of the general statements I have made, are here well shown.

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* When extensively softened, the cartilaginous tumours are very like masses of alveolar or gelatiniform cancer, and I believe have been often described as such. I think, too, that some of them are included by Vogel in his group of "gelatinous tumours" (Gallertgeschwülste), of which he says gelatiniform cancers are the most frequent form.

† Mus. Coll. Surg., No. 206.

‡ It is fully reported in the Lancet, Dec. 1850. The specimen is in the Museum of the Hospital.

* Mus. Coll. Surg., No. 200.

† Mus. Coll. Surg., No. 204. Rokitansky, B. I. p. 262. Mr. Humphry has particularly described this change, Lectures, p. 142.

‡ Mus. Coll. Surg., 779. The patient recovered from the operation, but died two months afterwards with disease of the chest.

It is extremely rare, I think, for a cartilaginous tumour to grow within the articular end, or in the medullary tissue near it, in a large long bone. Here is, however, a striking specimen presented by Mr. Langston Parker to Mr. Stanley. It was removed by amputation of the lower part of the leg, from a young gentleman in whom it had grown slowly, and had distinctly pulsated. The lower end of the fibula is expanded and wasted by a growth of cartilage, mixed with what appears to be fibro-plastic tissue. The growth is rather larger than an egg, and is invested by the remains of the expanded fibula, and by the periosteum; and the relations of the chief blood-vessels make it probable that the pulsation felt during life must have been derived from that of the vessels within the tumour.*

When a cartilaginous tumour grows at the middle of the shaft of a large long bone, it is, I think, usual to find coincidently both an external and an internal growth. Cartilage lies outside the shaft, beneath the periosteum; and another mass may fill the corresponding portion of the medullary canal. Then, in the concurrent growth of the two masses, the wall of the bone between them wastes or is broken up, and they may form one great tumour set between the ends of the shaft. These are the cartilaginous tumours which most imitate the progress of malignant disease. They are indeed very rare; but the chance of the existence of such an one where we might be anticipating a malignant tumour, is always to be added to the motives for amputation in cases of tumours round the shafts of these long bones.†

When cartilaginous tumours grow at the attachment of tendons (and they often do so, especially about the lower part of the femur), they are peculiarly apt to acquire narrow bases of attachment. In these cases one usually finds a layer of cartilage incrusting some cancellous and medullary bone, and the bone, narrowing itself, extends into continuity with the wall or the cancellous tissue of the subjacent shaft. Such tumours have, then, the characters of polypoid outgrowths from the bone, and may be treated accordingly; for, when cut or broken off, their stems (at least, if they consist of only bone) will not grow. Indeed, this stem may chance to be unwittingly broken, as in a tumour* removed by Mr. Lawrence. It had grown on the inner and lower part of the femur, and, when fairly exposed, was easily detached without further cutting: the narrowest part of its stem rested in a slight depression in the femur, but had no connection by tissue with it. It seemed as if the narrow pedicle of a tumour, so large as this was, had been by accident broken off, and that friction of the broken surfaces had smoothed and fitted them together.

Such are some of the chief facts to be noted about the cartilaginous tumours on the large long bones.

On the jaws these tumours are, I believe, very rare. I know but one specimen on the upper jaw alone,—a great tumour, portions of which are preserved in the Museum of Guy's Hospital, and of which the history, by Mr. Morgan, is in the Hospital Reports.

On the lower jaw such tumours appear prone to acquire a peculiar shape, affecting the whole extent of the bone. One of the most remarkable tumours in the Museum of the College† is of this kind. The patient was a lady thirty-nine years old. The tumour had been growing eight years; it commenced as a small hard tumour just below the first right molar tooth, and gradually enlarged till it enclosed the whole jaw, except its right ascending portion. It measured two feet in circumference and six inches in depth, and the patient died exhausted by want of food, which she was unable to swallow, and by the ulceration of parts of the tumour during the last two years of her life.

M. Lebert‡ has recorded a case in which a tumour like this was removed by Dieffenbach. In three successive operations he removed it by instalments, and the patient finally recovered.

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* The specimen is in the Museum of St. Bartholomew's Hospital. No. 783 in the Mus Coll. Surg. is an ossified cartilaginous tumour within the upper end of the fibula. In the Museum of St. Thomas's Hospital is a most remarkable instance of cartilaginous tumours growing, at once, in the scapula, the upper part of the humerus, and the lower part of the same. In the last-named part the cartilage lies within the thinned walls of the bone. The case is described by Mr. William Adams in the Proc. of the Pathol. Soc., ol. ii.

† A specimen of this form is in the Museum of St. Bartholomew's, in and upon a femur, in Ser. i. No. 111; and one of very large size, around and in the upper third of the femur, is in Guy's Hospital Museum, 1160, 86. One, also, is mentioned by Mr. Hawkins as occurring in the middle of the shaft of the humerus (MEDICAL GAZETTE, vol. xxv. p. 476.)

* Mus. St. Bartholomew's, Ser. i. 183.

† No. 1031 and 201.

‡ Abhandlungen, p. 198.

The cartilaginous tumours that grow about the cranial bones and the vertebræ show, in a marked manner, that reckless mode of growth (if I may so speak) which is more generally a characteristic of malignant tumours. They grow in every direction; pressing, and displacing, and leading to the destruction of, important parts, and tracking their way along even narrow channels.

Here, for example, is a tumour,* composed, for the most part, of cartilage, which grew in connection with the bones of the face and head of a lad sixteen years old. It involved both superior maxillary bones, extended into the left orbit, and through the left side of the base of the skull into its cavity, compressing the anterior lobes of the cerebrum: it was also united to the soft palate, and protruded the left nostril, and the integuments of the face.

The commencement of a similar growth is probably shown in a specimen,† in which, together with changes effected by the growth of nasal polypi, one sees the ethmoid cells completely filled with firm semitransparent cartilage, a mass of which projects in a round tumour into the upper part of the left nasal fossa.

And here I may adduce, in proof of the tracking growth of the cartilaginous tumours, the case of one‡ originating in the heads of the ribs, which extended through the intervertebral foramina into the spinal canal, where, growing widely, and compressing the spinal cord, it produced complete paralysis of the pelvic organs and the lower extremities.

The cartilaginous tumours of the hands deserve a special notice.

As many, I believe, as forty cases might be collected from various records, in which the bones of one or both hands, and sometimes of the feet also, have been the seats of numerous cartilaginous tumours. Several of these cases were collected by John Bell;§ many more by Müller,|| who drew, indeed, from these cases the greater part of his general account of enchondroma; and many more might now be added to the list. I have here four admirable specimens of the disease, besides several in which single bones of the fingers are the seats of similar tumours.

The first of these, in the Museum of the College,* from the collection of Sir Astley Cooper, consists of the amputated fingers and heads of the metacarpal bones of a girl 13½ years old. Tumours had been growing in these bones for eleven years. and now there are eleven or twelve, from half an inch to an inch and a half in diameter, and all formed of pure cartilage.

The second was presented to the Museum of St. Bartholomew's by Mr. Hodgson.† It comprises the right hand, and the little finger of the left hand, of a lad 14 years old, in which, without any known cause, tumours had been growing from early childhood. In the right hand the metacarpal bone of the thumb contains two tumours; that of the fore finger three or four tumours, of which the smallest is an inch, and the largest is three inches in diameter: the first and second phalanges, also, of the fore finger contain tumours; the middle finger appears normal; the third finger has one tumour in its metacarpal bone, one in its first phalanx, and two in its second phalanx; the little finger has as many in corresponding positions. On the left hand the only tumour was that in the first phalanx of the fore finger.

A third preparation‡ contains the fore and little fingers removed by Mr. Lawrence from a healthy lad seventeen years old. He had on his left hand four, and on his right hand six tumours; but those that were removed were alone troublesome and increasing. They varied from one inch and a half to one-third of an inch in diameter, were all covered with healthy smooth skin, and appeared to grow from the interior of the bones. No account could be given of their origin: they began to grow when he was five years old, and some grew more quickly than others. It will be seen that in both fingers the formation of cartilage in the metacarpal bones and the second phalanges is scarcely attended with any swelling: indeed, till the operation was being performed, they were not supposed to be the seats of disease, though their medullary cavities are quite full of cartilage.

The fourth specimen is, I believe, the most remarkable yet seen. I received it yesterday from Mr. Salmon, of Wedmore. It is the right hand of a labourer, fifty-six years old, from whom, when he was sixteen

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* Mus. St. Bartholomew's Hospital, Ser. xxxv. No. 47. Drawn in Mr. Stanley's Illustrations of Diseases of the Bones, pl. xiii. fig. 4.

† Mus. Coll. Surg. 2199.

‡ Mus. St. Bartholomew's Hospital, Ser. i. No 115.

§ Principles of Surgery, vol. iii. p. 65.

|| On Cancer. Whenever the statements made by Müller, respecting the general characters of these tumours, differ from the account here given, the differences may, I think, be explained by his taking for the type the tumours of the hand. This alone could have made him regard so little the ossification of cartilaginous tumours.

* No. 778.

† Described in the Pathological Appendix to the Catalogue.

‡ Mus. St. Bartholomew's, Pathol. Appendix.

years old, the fore finger of the left hand was removed with a tumour weighing 2lb. 5oz. The little finger of the same hand has a tumour about as large as a walnut: the whole length of his left tibia has irregular nodules on its anterior and inner surface, and some enlargement exists at his left second toe. On the right hand there are tumours on every finger, and one spheroidal mass nearly six inches in diameter, in which the second and third fingers appear completely buried, the walls of their phalanges being only just discernible in the mass that has formed by the coalition of tumours that grew within them.

To these I may add an illustration from Professor Gluge's Pathological Anatomy, in which he represents, from the museum of Professor Vrolik, the hands of a young man, nineteen years old, in which tumours had been growing since the age of two years. On the left hand the tumours are, one in the metacarpal bone of the first, and one in that of the second finger; two in the phalanges of the second, and two in those of the third; and one in the first phalanx of the fourth finger. On the right hand there are tumours in the metacarpal bone and all the phalanges of the fore finger, in the metacarpal bone of the second, and in the phalanges of the third and fourth fingers.

The disease which these specimens illustrate begins, I believe, exclusively in the early period of life, during childhood, or at least before puberty, and sometimes even before birth. It occurs, also, much more frequently in boys than in girls. One or more, or nearly all, of the phalanges or metacarpal bones of one or both hands, may enlarge into an oval, or round, or cordate swelling, enlarging slowly, and without pain. When such swellings are grouped, they produce strange distortions of the hands, making them look like those of people who have accumulated gouty deposits, or, as John Bell delights to repeat, like the toes and claws of sculptured griffins. They may greatly elongate the fingers, but they more commonly press them asunder, limiting and hindering their movements.

There is no rule or symmetry observed in the affections of the hands, except that the thumb is less frequently than the fingers the seat of growths.

In the large majority of cases, if not in all, each tumour grows within a bone, the walls of which are gradually extended and adapted to its growth. And this position within the bones is the more remarkable, because, in the cases of single cartilaginous tumours of the fingers or hands, the growth takes place not more, but rather less often, within than without the bone; these single tumours commonly growing, as those of the larger long bones do, between the periosteum and shaft.[*]

Thus, growing within the bones, the cartilaginous tumours may be sometimes found, even in the same hand, in all stages of growth. One phalanx or metacarpal bone may have its medullary cavity full of cartilage without any external appearance of enlargement; another may be slightly wollen-out at one part, or in its whole periphery; another so extended on one side, or uniformly, that its walls form only a thin shell around the mass of cartilage; in another, the cartilage may have grown out through holes absorbed in the walls of the bone, and may then have spread out on its exterior; while from another it may have protruded through apertures even in the integuments, gradually thinned and ulcerated:[†] or, as the specimen from Mr. Salmon shows, we may find not only such a protrusion through integuments, but two originally distinct tumours, growing out beyond the limits of their respective bones, and coalescing in one huge mass. In cases of this kind, the cartilaginous mass in each bone usually appears as a single tumour, with very delicate, if any, partitions. It may have a coarsely granulated aspect, but it is rarely divided into distinct nodules, or strongly intersected. Its exterior is adapted closely to the interior of the shell of bone, but is not continuous with it, except by blood-vessels. It rarely ossifies, except in a few small scattered cancellous masses in its mid-substance.[‡] And it is worth observing, that the tumours often project on only one side of a bone; for, when this happens in the metacarpus, it is often very hard to tell which of two adjacent metacarpal bones should be cut-out in case of need.

The cases of this singular disease have shown great diversity as to the course of the tumours, and in their modes and rates of growth,—some making progress, some remaining stationary; and I believe it has often happened that at the time of manhood all have ceased to grow. But in regard to all these questions, important as they are, we are yet in need of facts.

It would be easy, and as vain as easy, to speculate on the meaning of such a disease as this. I believe no reasonable explanation of it can as yet be more than guessed at.

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[*] Mus. Coll Surg. No. 772-3.

[†] A good case illustrating the last-mentioned fact is represented by Professor Müller, in his Principles of Surgery, p. 179. The tumour on the back of the metacarpus weighed fourteen pounds, and after protrusion bled frequently. John Bell also has recorded several such cases.

[‡] Specimens of ossification are in the College Museum, No. 785-6.

The only remaining instances of cartilaginous tumours to which I shall refer are those that grow near the parotid, or, much more rarely, near the submaxillary gland.[*] Some of these are formed of pure cartilage, and might be taken as types of the cartilaginous tumour; but more are composed of cartilage variously mixed with other tissues, and especially with what appears to be an imperfect or a perverted glandular tissue. Whichever of these forms they may have, they are commonly imbedded in the gland. They are sometimes wholly surrounded by the gland-substance, but much more commonly are more or less deeply imbedded in it, and covered with its fascia.

These tumours are generally invested with tough fibro-cellular capsules, which, though sometimes loose, are more commonly so closely attached to the surrounding parts that it is difficult to dissect them out. And the inconvenience of this is not a little increased by the frequent contact of branches of the facial nerve, which are apt to adhere very closely to the deep part of the tumour, or to be imbedded between its lobes, or may even stretch over its surface.[†]

The general aspect of these tumours depends much on the proportion in which the cartilage and their other component tissues are mixed. When they are of pure cartilage, or when the cartilage (or rather the delicately fibrous cartilage) greatly predominates, they may present all the general characters that I described. Such a case is illustrated by that to which, among all the specimens of the kind, the primary belongs. It was removed by Mr. Hunter, and is enough to prove the skill and boldness as an operator which some have denied him. The case was that of a man, thirty-seven years old, who, sixteen years previously, fell and bruised his cheek. Shortly after the injury, the part began to swell, and the swelling regularly increased for four or five years, when he again fell and struck the swelling, which, after this, extended, especially at its lower part and base. It seemed quite loose, and moveable without pain. Mr. Hunter extirpated it, and with complete success. It weighed 144 ounces, and measures in its chief dimensions 9 inches by 7. It presents a striking instance of the conglomerate cartilaginous tumour, consisting of numerous round masses of pale, semi-transparent, glistening cartilage, connected by their several fibro-cellular investments; and its exterior is deeply lobed and nodulated. Its apparent composition is confirmed by the microscopic examinations of Mr. Quekett,[*] who found it composed of cartilage, in which some of the intercellular substance is homogeneous, and some finely fibrous.

But when in these tumours the cartilage is equalled or exceeded in quantity by the other tissue of which they may consist, we may find the same oval and nodular or lobed form, and the same hardness or firmness and elasticity, but they will appear, on section, opaque white or cream-coloured, and less glistening than cartilage.[†] Generally these mixed tumours appear uniform; but sometimes portions of purer cartilage are imbedded in the mixed tissue, and obscurely bounded from it.[‡]

In microscopic characters the cartilaginous part of these tumours has, I believe, no peculiarity; different specimens may offer all the variety of forms to which I have already referred. The tissue mixed with the cartilaginous is at present, I think, of uncertain nature. In five cases I have found it, for the most part, present a lobed and clustered structure, with fibrous-looking tissue encircling spaces that are filled with nuclei and cells. These enclosed spaces look so like the acini of a conglomerate gland, that they seem to confirm the opinion one might form from its general aspect—namely, that it is an imitation of gland-tissue. And this is confirmed by the character of the cells within the seeming acini; for they are usually small, round or oval, flattened, dimly granular, with large pellucid nuclei with nucleoli; and they have the general traits of gland-cells. They lie either like a thin epithelial lining of the spaces I just mentioned, or else they are clustered within them; or they may be irregularly grouped through the whole substance of the tumour; and in all cases abundant free nuclei like their own are mingled with them.[§]

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[*] These are grouped by Rokitansky as the third variety of the Gelatinous Sarcoma, with a recognition of their affinity to Enchondroma. Mr. Syme names them "Fibro-cartilaginous Sarcoma" (Principles of Surgery, vol. i. p. 89). The first good description of them was given by Mr. Lawrence (in his paper on Tumours, already often quoted). Mr. Cæsar Hawkins described them, for the most part, as "conglomerate tumours."

[†] The imbedding of important parts in a cartilaginous tumour need be remembered. In the Museum of St. George's Hospital is a specimen of this kind, about seven inches in diameter, which was sent to the museum with the history, that, in removing it from the deep tissues of the thigh, the femoral artery was cut across when passing through its substance.

[*] Histological Catalogue, vol. i. p. 3, Ag. 52.

[†] They are among the tumours which one finds described as like turnips or like potatoes.

[‡] I have often endeavoured to see whence this mixture of tissues results, and especially whether the one tissue is transformed into the other; but I have not been able to discover this. Rather, I believe that these tumours may have been in the first instance composed wholly of one of the two principal tissues, and that in their further growth this primary tissue is superseded by the other.

[§] Such are the most general characters of these cells; but they are apt to vary from them, being

In general history, especially in their slow and painless growth, the absence of any morbid influence except that produced by pressure, on the surrounding parts, the absence of proneness to foul ulceration, and of tendency to return after removal; in all these, the tumours over the parotid agree, I believe, with the other forms of cartilaginous tumours. I will therefore not delay to relate cases of them, but will draw towards conclusion by referring to some points connected with the general history and nature of the cartilaginous tumours.

First, then, concerning their origin:—They begin, in a large majority of cases, in early life; between childhood and puberty. Yet they may begin late in life. I saw one on the hand which had been of no long duration when it was removed from a man 70 years old; another, growing in the humerus, and described by Mr. W. Adams,* had grown quickly in a man of 61; another began to grow at the same age, in a woman's thumb.†

Then, concerning their nature; they may be regarded as usually completely innocent tumours, and yet there are some cases recorded in which we must believe that after a cartilaginous tumour has been removed, another has grown in the same place. I saw one such in a woman 30 years old, in whom, soon after the removal of one tumour from the parotid region, another grew, and acquired a great size. This was an unmixed cartilaginous tumour, and I believe the first was of the same nature. Dr. Hughes Bennet ‡ has related a case in which Mr. Syme removed a cartilaginous tumour of the arm, by amputation at the shoulder-joint. Subsequently, the patient, a girl 14 years old, died with tumours in the stump and axilla. Mr. Liston removed a portion of the scapula, with a great tumour in its spine and acromion, which I have no doubt is a soft cartilaginous tumour.* Three years afterwards the patient died, with what is described as a return of the disease. Mr. Fergusson showed at the Pathological Society a fibro-cartilaginous tumour† of the lower jaw, which had grown twice after the complete removal of similar tumours from the same part. In the Museum at Guy's Hospital also, there is a cartilaginous tumour growing from the angle of the lower jaw into the mouth, which is said to have grown after complete removal of a similar tumour with the portion of lower jaw to which it was connected. Lastly, Professor Gluge‡ records two cases in which we must believe that recurrence of cartilaginous tumours ensued after complete removal. In one, a cartilaginous tumour, of 13 years' growth, and 9½ pounds weight, over a man's scapula, clavicle, and neck, returned in the ribs, and destroyed life in a year and a half. In another, a similar tumour of the orbit returned two and a half years after removal.

We must conclude, I think, from these cases, that, although the general rule of innocence of cartilaginous tumours is established by their usual history, by numerous instances of permanent health after removal, and by cases in which, after death, no similar growths are found in lymphatics or internal organs, yet recurrence after operations may ensue. And I think that when this happens it will generally be found that the recurring growths, if not the original growths also, are soft, rapid in their increase, and apt to protrude and destroy adjacent parts; as if we had again in these an instance of that gradual approximation to the completely malignant characters of which I spoke in the last lecture.

In connection with this point I may also refer to the following facts in the pathology of cartilaginous tumours,—namely, first, that many may exist in the same person; secondly, that they are sometimes hereditary; thirdly, that they are not unfrequently mingled with malignant growths.

Multiplicity is sufficiently marked in the cases of the hands and feet, but has been observed, though more rarely, in other parts; as in a case recorded by Mr. William Adams, and already referred to as presenting tumours at once in the scapula and parts of the humerus.

The hereditary occurrence was observed in the case of a cartilaginous tumour of the pelvis, of which I have already spoken as examined by Mr. Donald Dalrymple. The patient's father had a large ossified

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more angular, or bearing processes, or being attenuated or caudate. Even if we may consider them as imitating gland-structures, yet it may be a question whether they are related to the adjacent parotid gland, or to lymphatic gland. It might be easy to discriminate between the elements of the parotid and of a lymphatic in their natural state; but a morbid imitation of either of them may deviate far enough to be as much like the other. And it is well to remember that these tumours have exactly the seats of naturally existing lymphatic glands, and are often closely imitated by mere enlargements of these glands; so that, possibly, future researches may prove that they are cartilaginous tumours growing in and with a lymphatic gland over or within the parotid or submaxillary gland.

[*] Proceedings of the Pathological Society, ii., 344.

[†] Lebert, Abhandlungen, p. 191.

[‡] On Cancerous and Cancroid Growths, pp. 108 and 258.

[*] It is in the College Museum, No. 781.

[†] Mr. Simon examined it with the microscope, and found it formed of well-marked cartilage, with a fibrous basis.

[‡] Atlas der pathologischen Anatomie, Lief. iv. and Pathologische Histologie, p, 67.

enchondroma of the radius, which was removed by Mr. Martin.[*]

The conjunction of cartilaginous and medullary cancerous tumours may, perhaps, be called frequent, especially in the testicle. A man, 38 years old, was under Mr. Lawrence's care with an apparent enlargement of one testicle, which he ascribed to a blow received 18 months previously. Three weeks after the blow he noticed an enlargement which regularly increased, and formed an oval mass about 4 inches long. This, at its upper part, was moderately firm and elastic; but in the lower third it felt incompressibly hard. It was removed, and proved to be a pale, soft, greyish, medullary cancer in the testicle, having in its lower part a mass of cartilage, with scattered points of bone, and some intercellular tissue.[†] The patient died a fortnight after the operation; and it was interesting to observe, as illustrating the contrast between the cartilaginous and the cancerous growths, that he had soft medullary cancerous tumours in the situation of his lumbar lymphatic glands, but no cartilaginous tissue in or mingled with them.

A specimen closely resembling this, and with a very similar history, is in the Museum of the University of Cambridge. Another is in the Museum of Guy's Hospital, of which it is said that the patient died with return of the medullary disease. Müller noticed the same combination.[‡] Virchow[§] has cited two cases, and described one, all illustrating the same singular fact. In the three specimens that I have seen of conjunction of cartilaginous and medullary growths in the testicle, the cartilage appears as an isolated mass in the substance of the medullary tumour, and is enclosed in a distinct capsule. There are other cases, however, in which the two morbid substances, though distinct, yet lie in so close contact, that they are confused with one another. Thus, in a tumour which was attached to the front of the lumbar vertebræ, and weighed thirteen pounds, half is formed of soft flocculent medullary substance, and half of nodules of cartilage, some with soft, some with osseous, centres.[*] A tumour removed from over a woman's parotid gland by Mr. Lloyd, is invested by a single fibro-cellular capsule; but one half is cartilaginous and the other looks like medullary substance, and they are mingled, with no distinct boundary line at their contiguous borders.[†] And lastly, in a case of which preparations are in the Museum of St. Thomas's Hospital, Mr. Dodd removed a genuine and apparently unmixed cartilaginous tumour from a man's ribs; but in three months another tumour appeared in the same part, formed of closely mingled cartilage and medullary substance. This quickly proved fatal.

I need hardly remark on the bearing which this last case may have on the question of the recurrence of cartilaginous tumours, and on that of the changes of character which may ensue in tumours generally, at their successive occasions of recurrence. It gives to all these cases a much higher interest than would attach to them if regarded only as rarities and strange things.

But it is not with the malignant diseases alone that cartilage is found in tumours. I have described it as combined with what appears like glandular tissue in the tumours over the parotid, and I have seen bone in similar combination in a tumour in the lip. In the College-Museum are specimens of closely grouped nodules, and irregular masses of pure white cartilage, imbedded in fibro-cystic tumours in the testicle;[‡] and more numerous specimens of the same kind are in the Museum of St. Thomas's Hospital. In speaking of the fibro-cellular tumours, I mentioned two in which cartilage was similarly mingled with their more essential constituent; and in the Museum of Guy's Hospital is a tumour removed from beneath the gastrocnemius muscle, which consists of both fibro-cellular and adipose tissue, with abundant imbedded nodules of cartilage. And, lastly, similar combinations appear to exist of cartilaginous with fibro-plastic growths. Such is, I believe, the composition of three tumours in the Museum of St. Bartholomew; of which one surrounds the head of the tumour;[§] another involves the bones of the face, and extends into the cranium;[||] and a third occupies and expands the lower end of the fibula.[¶]

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[*] The specimens are in the Museum of the Norfolk and Norwich Hospital. In the number of the Edinburgh Monthly Journal for the present month, an abstract of the case is published by Mr. Cobbold, who relates in addition to the facts I had learnt from Mr. Thomas Crosse, that a brother of the man who had the tumour in the pelvis has mollities ossium, and that "others of his kindred had been subjected to the debilitating influences of a perverted nutrition."

[†] The specimen and drawings are in the Museum of St. Bartholomew's. Microscopic examinations were made of the diseased parts.

[‡] On Cancer, p. 185.

[§] Verhandl. der phys.-med. Gesellschaft in Wrzbüurg. Vol. i., p. 134. 1850.

[*] Mus. Coll. Surg. 207; Mus. St. Bartholomew's, Ser. 35, No. 49.

[†] Mus. Coll. Surg. 207 A.; Mus. St. Bartholomew's Ser. 35, No. 45. The patient was alive at least seven years after the removal of the tumour.

[‡] No. 2384; and others not yet described.

[§] Series i. 41. And Mr. Stanley's Illustrations, pl. 13, fig. 4.

[||] Ser. 35, 47., and the same Illustr., pl.14, fig.3.

[¶] Presented by Mr. Langston Parker, but not yet described.

In all these facts concerning its combination with other morbidly produced structure, there must be something of much importance in relation to the physiology of cartilage; but as yet, I believe, we cannot comprehend it Such combinations are not, I believe, imitated in the cases of any other structures found in tumours; even those that are thus combined with cartilage, do not, I think, combine with one another, if we accept the cases of intra-uterine morbid growths; but, as yet, the interest that belongs to all these inquiries is only the interest of mystery and promise to future investigators.

LECTURE VII.

Osseous Tumours.—Their occurrence in soft parts—their varieties when connected with bones; cancellous, and compact or ivory-like exostoses—general and microscopic characters of each form: their respective origins, and correspondences with the bones on which they grow—particular illustrations of the cancellous tumour; and of the compact, in its several forms, about the frontal and other cranial bones, the lower jaw, and the long bones: their occurrence, also, in other mammalia; peculiar osseous tumours on the phalanges of toes.

Principal examples of osseous outgrowths, as distinguished from tumours; on the bones of the face and head; within the the tables of the skull; on the femur, &c. Multiple osseous growths; peculiarity of diathesis; distinction of osseous from osteoid growths, and from growths of bone connected with cancer.

Much of what concerns the osseous tumours was stated in the last lecture: for, indeed, many of them are only examples of another state of the cartilaginous tumours to which that lecture was devoted. Still, it may be desirable to speak of the characters of such tumours as, whether derived from cartilage or not, are found wholly, or almost wholly, composed of bone.

Osseous tumours, even more generally than cartilaginous, are connected with the bones, with which, moreover, though they may have the other characters of tumours, they are always continuous, after the manner of outgrowths. They are, however, occasionally found in soft parts, as distinct and discontinuous tumours, invested with fibro-cellular capsules. Thus, in the College Museum[*], is a small, completely osseous tumour, formed of soft cancellous tissue with medulla, which lies over the dorsal surface of the trapezial and scaphoid bones, completely isolated from them and all the adjacent bones. In the Museum of St. George's Hospital is a tumour formed of very compact bony tissue, which lay over the palmar aspect of the first metacarpal bone, loosely imbedded in the fibro-cellular tissue, and easily separated from the flexor tendons of the finger[†]. It had been growing five years in a middle-aged woman. So, but rarely and imperfectly, the cartilaginous tumours over the parotid gland are ossified;[*] and those in the lungs[†] and testicle.

At present these isolated osseous tumours are interesting for little more than their rarity. It is to those connected with bones that I must now particularly address myself.

I have already said that all these have the character of continuous growths; that they are like outgrowths rather than tumours. And it is not easy to draw any line of distinction between what deserve to be considered as tumours, and such accumulations of bone as may ensue in consequence of superficial inflammation or other disease of the bone or periosteum. The exostoses and the hyperostoses of nosology are not to be severally defined without artifice; but, in general, we may take this as a convenient, and perhaps a just method of dividing them: namely, that those may be reckoned as osseous tumours, or outgrowths of the nature of tumours, whose base of attachment to the original bone is defined, and grows, if at all, at a less rate than their outstanding mass.[‡] Those which are not of the nature of tumours are generally not only ill-defined, but widely spread at their bases of attachment, and the additions made to them increase their bases rather than their heights or their whole masses.

Of osseous tumours, thus roughly defined, two chief kinds may be observed; namely, the cancellous, and the compact or ivory-like, which, speaking generally, may be said to resemble respectively the medullary tissue, and the walls or compact substance of healthy bone. In both alike the bone is usually true and good bone. By my own observations of it I know no more than this; but Mr. Quekett, who has submitted to microscopic examination portions of all the osseous tumours in the Museum, confirms the general statement in all particulars. In different specimens there may be varieties in the proportion and arrangement of bloodvessels, and in the size and development of the corpuscles and their canals, but the proper characters of the bone of the species in which the tumour occurs are not far departed from.

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[*] No. 203.

[†] An account of it is reported in the Medical Times, Aug. 3, 1850.

[*] Museum Coll. Surg., No. 204.

[†] Museum of St. Thomas's Hospital.

[‡] Mr. Stanley particularly remarks this in relation to operations for removal of exostoses (On Diseases of the Bones, p. 150.)

I believe the homology of the osseous tumours is, in chemical qualities, as perfect as it is in structure ; and that, as with the natural bones, so with these, we may not ascribe differences of hardness or density to the different proportions of the animal, and the saline and earthy components, but to the different manner in which the similar material that they compose is, in different specimens, compacted. Their varieties of hardness depend on mechanical rather than on chemical differences.

Of the general methods of ossification of cartilaginous tumours I spoke in my last lecture, and then noticed that in nearly all cases when the ossification of the tumours is completed, they consist of a very thin layer or wall of compact tissue, covering-in a mass of cancellous and medullary substance: and thus they are composed, whether the cartilage-growth began within or upon the bone. It is probable that, in some instances, the hardest osseous tumours may be also formed by transformation of cartilage into bone. Thus, an exceedingly hard ivory-like tumour at the angle of the lower jaw, in the Museum of the College,[*] has so exactly the nodular and irregularly spheroidal shape belonging to cartilaginous tumours, and to the rare cancellous bony tumours in the same part, that we can scarcely doubt it had a primordial cartilaginous condition. So, too, Professor Goodsir tells me there is in the Museum of the University of Edinburgh a tumour of the humerus, half of which is as hard and compact as ivory, and half is cartilaginous. In the Museum of Guy's Hospital there is a somewhat similar specimen: in which, however, the hardness of the bone may be due to inflammatory induration of an ordinary cancellous osseous growth.

These, however, are probably exceptions to the general rule concerning the compact or ivory exostoses ; for, for the majority of these, Rokitansky says truly that no preparatory cartilage is formed. As, in the natural ossification of the skull, the bone is formed, not in a matrix of cartilage, but in fibrous tissue, layers of which are successfully ossified, so probably are the hard bony tumours of the skull formed.

The general characters of the cancellous bony tumours are so nearly described in the account of the cartilaginous tumours from which they originate, that I need only briefly refer to them. They usually affect a round shape, with projecting lobes or nodules, which answer to those of the conglomerate cartilaginous tumours, and are often pointed or angulated. They may, however, be very smooth on their surface, whether they have grown within bones whose extended walls form now their outer layer, or without them under the periosteum. When completely ossified, their respective tissues, compact and medullary, are usually continuous with those of the bone on which they are planted ; and the later periods of growth seem attended with such mutual adaptation as may tend towards making one continuous, though deformed, mass of the old and the new bone.

The singularities of position in which the osseous tumours may be found, and the important hindrances that may result from their interference with adjacent parts, I need not detail ; they are amply enumerated by Mr. Stanley.

Of their rates of growth little is known, but I believe that when a cartilaginous tumour is completely ossified, the growth of the bony tumour is extremely slow. However, osseous tumours may be found of an enormous size. The largest that I know is in the Museum of the College.[*] It nearly surrounds the upper two-thirds of a tibia, in an irregularly oval mass, with a nodulated surface, almost entirely covered-in by a thin layer of compact tissue, and cancellous in all its interior. It measures exactly a yard in its circumference, and the limb, which was amputated by Mr. Gay, a former surgeon of St. Bartholomew's Hospital, weighed 42 pounds.

Another tumour of large size is in the Museum of the same Hospital.[†] A great nodulated mass of bone is attached to the ischium and pubes, and formed part of a tumour of which the rest was nodulated cartilage.

The compact, hard, or ivory-like bony tumours occur especially about the bones of the head, and present several diversities of form. Some are uniform and simple ; others variously lobed, or nodular. The simple tumours are commonly attached to the skull by narrowed bases, over which their chief masses are prominent on one side, or all round. A good specimen of this kind is in the Museum of St. Bartholomew's Hospital,[‡] which shows besides that these tumours may consist of an exterior hard, and an interior cancellous, tissue, respectively resembling, and continuous with, the outer table and the diploe of the skull. Some of these hard tumours have the shape of biconvex lenses, resting with one convex surface on the skull; and of such as these more than one may be often found on the same skull.*

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[*] No 1035: compare it with a cancellous tumour of the same form, in the Museum at St. George's Hospital, removed by Mr. Tatum.

[*] No. 3220. It is engraved in Cheselden's Osteographea. Tab. 53, f. 123.

[†] Series I A. No. 133, and Series I, No. 118.

[‡] Series I. 71. Ser. I. A. 124 in the same Museum, and No. 3215 in the Museum of the College are nearly similar specimens.

A much more formidable disease than these present exists in the nodulated and larger hard bony tumours about the bones of the skull. These are not like outgrowths from the outer table and diploe; for they often, or I believe usually, grow first between the tables of the skull, or in the cavities of the frontal or other sinuses. Increasing in these parts, they may tend in every direction, penetrating the tables of the skull, and forming large masses, projecting as much into the interior of the skull as on its exterior.

The most frequent seat of such tumours is in the frontal bone, especially about its superciliary and orbital parts, and they are horrible by their pressure into the cavities of both the cranium and the orbit, compressing the brain, and protruding one or both eyes.

I have here some examples of the disease. Its characters, so far as the growth is concerned, are best shown in a huge mass which grew from the forehead of an ox, originating apparently in the frontal sinuses.† It is like a great spheroidal mass of ivory, measuring 8½ inches in diameter, and weighing upwards of sixteen pounds. Its outer surface, though knobbed and ridged, is yet compact like an elephant's tusk; and, in similar likeness, its section shows at one part a thin investing layer, like the bone covering the ivory. It is nearly all solid, hard, close-textured, and heavy; only a few irregular cavities, and one with smooth walls, appear in its interior, and one may trace the orifices of many canals for blood-vessels. Mr. Quekett found that this tumour had a higher specific gravity than any bone, except that which is found in what are called the porcellaneous deposits or transformations of bone in the heads of bones affected with chronic rheumatism. But it has in every part the structure of true bone.

Just like this, in the general characters of their tissue, are the hard bony tumours from the human frontal bone. In one, an Hunterian specimen,‡ such a tumour, 2½ inches in diameter, deeply lobed and knotted, fills the frontal sinuses and the upper part of the left orbit, encroaches into the right orbit, and projects for nearly an inch on both the surfaces of the skull. It appears to have originated in the ethmoidal or frontal cells, and, in its growth, to have displaced and destroyed by pressure the adjacent parts of the tables of the skull and the wall of the orbit. It is, for the most part, as hard as ivory, but in its central and posterior portion is composed of very close cancellous tissue.

A specimen, far surpassing this in size, but resembling it in all its general characters and relations, is in the Museum of the University of Cambridge. It is the largest and best specimen of the kind that I have seen, and its osseous structure is distinct; only, as Professor Clark has found, it is irregular: in the hardest parts there are neither Haversian canals nor lacunæ; in the less hard parts, the canals are very large, and the lacunæ are not arranged in circles around them; and everywhere the lacunæ are of irregular or distorted forms.

A smaller specimen is in the Museum of St. Bartholomew's Hospital. A girl, twenty years old, was admitted with protrusion of the left eye-ball, which appeared due to an osseous growth projecting at the anterior, upper, and inner part of the orbit. None but the anterior boundaries of this growth could be discerned. It had been observed protruding the eye for three years, and had regularly increased; it was still increasing, and was productive of severe pain in the eye-ball, and about the side of the head and face. It seemed, therefore, necessary to attempt the removal of the tumour, or at least to remove some part of it, with the hope that the disturbance of its growth might lead to its necrosis and separation. A portion of it was with great difficulty sawn off; but the patient died with suppuration in the membranes of the anterior part of the cerebrum.

Now all these cases, corroborated as they are by others upon record, prove the general character and relations of these tumours. Their nodular form, and uniform, hard, ivory-like texture; their growth in the diploe or sinuses as isolated or narrowly attached masses; their tendency to extend in all directions; their raising and penetrating the tables of the skull, and growing out into the cavities of the skull and orbit; all show the exceeding difficulty and peril of operations on these tumours. The simpler kinds, that only grow outwards, may indeed be cut off with advantage, though seldom without great difficulty, and often the attempt to remove them has been made in vain; but these larger and nodular tumours about the brow can very rarely be either cut off or extirpated.*

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* Museum Coll. Surg. 793. See also Miller's Principles of Surgery, p. 476.

† Museum Coll. Surg. No. 2316.

‡ Mus. Coll. Surg. 795. It is engraved in Baillie's Morbid Anatomy, Fasc. x. pl. 1, fig. 2; and in Home, Philosoph. Trans., vol. lxxxix. p. 239.

The extirpation, however, which may be impossible for art, is sometimes effected by disease: these tumours are occasionally removed by sloughing. Such an event happened in a case related by Mr. Hilton;† and the great ivory-like mass, clean sloughed away, is in the Museum at Guy's. So, too, in a case by Mr. Lucas, a bony tumour at the edge of the orbit, after growing eight months, was exposed by an incision through the upper eyelid. The wound did not heal, the tumour continued to grow, and twelve months afterwards became "carious," and was detached. The course of treatment which these cases suggest has been, I believe, the only one worth imitation,—namely, exposure of the tumour, and the application, if need be, of escharotics to the surface of the bone.

These hard osseous tumours are very rarely found in connection with any bone but those of the skull. Here, however, is a well-marked specimen in the lower jaw; a nodulated mass, nearly three inches in diameter, invests the right angle of the jaw, and is, in its whole substance, as hard and heavy as ivory. I have already, also, referred to cases of similar hard tumours on the humerus: but they are extremely rare.

Osseous tumours of the lower jaw appear to be less rare in animals inferior to man; for the College Museum contains three specimens,‡ taken respectively from a Virginian opossum, a cat, and a kangaroo; and, which is more singular, one from a cod-fish. In this specimen,§ a disk-shaped mass of bone, two inches in diameter, extremely heavy and compact, is attached to the inner surface of the superior maxillary bone.

In the texture of these very hard bony tumours connected with the bones of the skull and the lower jaw, we may observe an instance of the general law of likeness between tumours and the parts most near to them; for their bone is like no other natural bone so much as the internal table of the skull, or the petrous bone, or inferior maxilla.

The same likeness is observable in the osseous tumours that are frequent on the last phalanx of the great toe, which, alone, now remain for me to speak of.||

No adequate explanation, I believe, can be offered for the occurrence of these growths. They may be sometimes referred to injury; yet the effects of injury to the great toe are so inconstant, that we cannot refer to injury as other than an indirect cause of the growth of tumours so singularly constant as these are in all their characters, and so nearly without exception limited to the one toe of all that are exposed to injury. They grow almost always on the margin, and usually on the inner margin, of the end of the last phalanx of the great toe; in only one specimen have I seen such a tumour springing from the middle of the dorsal surface of the phalanx; and, in only one, a similar tumour from the last phalanx of the little toe. Growing up from the margin, they project under the edge of the nail, lifting it up, and thinning the skin that covers them, till they present an excoriated surface at the side of the nail. Their growth is usually very slow, and when they have reached a diameter of from one-third to one-half of an inch, they commonly cease to grow, and become completely osseous. They are among the tumours whose independence is shown not only by abnormal growing, but by the staying of their growth when they have attained a certain natural stature.

I believe that they are not uniform in their method of development. In some specimens I have seen no cartilaginous basis; the bone appeared to form in fibrous tissue, as it were following, and at length overtaking, the fibrous growth. In another, the outer part of the tumour was formed of a thin layer of fibrous tissue, and between this and the growing bone was a layer of cartilage which had externally the stellate nuclei, and internally nuclei of ordinary form, among which the processes of bone were extending.

Whichever way the bone is formed, it is like that of the phalanx itself, cancellous but very hard, and with small spaces, and comparatively thick cancelli or laminæ bounding them. The outer layer, too, is rough and ill-defined, so that the growth looks like a branch from the phalanx, and, like a branch, is apt to sprout again when cut away, unless at least the end of the bone on which it grows be removed with it.

The account of osseous tumours would be very incomplete if there were not added to it some notice of those growths which are most like them, though they may lie beyond the range of any reasonable or convenient definition of tumours. Among these are certain growths of the bones of the face, tumour-like in their most prominent parts, and yet unlike tumours in that their bases of connection with the bones are very ill-defined, and that from their bases the morbid changes in which them-

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* The histories of some specimens in the Museum of St. George's Hospital illustrate these statements very well. See, also, Mr. Hawkins' Lectures.

† Guy's Hospital Reports, vol. i.

‡ Nos. 1036-7-8.

§ No. 1039.

|| Mus. Coll. Surg. 787-8-9, 790.

selves originated extend outwards on the same or even to other bones, gradually subsiding. In no instances can it be plainer than it is in these, that a nosological boundary of "Tumours" must be an arbitrary one.

Such growths as these are not very rare in the superior maxillary bone. Its ascending process may become enlarged and prominent, with an ill-defined hard swelling, very slowly increasing, and sometimes stopping short of any considerable deformity. But a much more formidable disease exists when a large portion of the bone, or the whole antrum, is involved; especially, because this is apt to be associated with diseases in the adjacent bones.

An extreme case is shown in a specimen from the Museum of Mr. Langstaff.* Two large masses of bone, of almost exactly symmetrical form and arrangement, project from the upper jaws and orbits, and have partially coalesced in the median line. They are rounded, deeply lobed, and nodular; nearly as hard and heavy as ivory; perforated with numerous apertures, apparently for blood-veseels. They project more than three inches in front of the face, aud an inch on each side, beyond the malar bones; they fill both orbits, the nasal cavities, and probably the antra, and they extend backwards to the pterygoid plates. Part of the septum of the nose, and the alveolar border of the jaw, are almost the only remaining indications of a face. The disease appears to have begun in the superior maxillary bones, and thence to have spread over the bones of the face; similar disease, in a less degree, existing in the bones adjacent to the chief outgrowths.

The patient, who was sixty years old, believed the disease had been eighteen years in progress, and ascribed it to repeated blows on the face. He suffered much pain in the face, eyes, and head. His eyes projected from the orbits: the right, after suppuration and sloughing of the cornea, shrivelled; the left was accidentally burst by a blow. During the last two years of his life he occasionally showed symptoms of insanity, and at last he died with apoplexy of the cerebral membranes.

The disease very rarely attains so horrible a state as is here shown. More commonly it is almost limited to the antrum. In this case it may exist almost without deformity. Here is a specimen† in which both the antra appear nearly filled by the thickening and in-growing of their walls; only small cavities in their centres remain. The new bone is hard, heavy and nearly solid, yet it is porous or finely cancellous, and is neither so compact nor so smooth on its cut surface as that of the "ivory exostosis." The same disease is manifest in a less degree upon the outer surfaces of the maxillary bones, and on the septum and side-walls of the nose.

The disease has a manifest tendency to concentrate itself in the maxillary bones; so much so that if a case be met with where only one of these bones is diseased, it may be removed with a fair prospect that the disease will not make progress in the adjacent parts. I believe, indeed, that this has been done, with a satisfactory result, in a case where already slight increase of some of the bones near the maxillary was observable: and there was good reason to apprehend the same result in a case on which Mr. Stanley operated. The patient was a girl, 15 years old, in whom enlargement of the nasal process of the superior maxillary bone had been observed for eight years, and was still increasing. It had as yet produced no pain, and no deformity of the cheek, or the orbit, or the palate. But it was regularly increasing; and as it could be certainly anticipated to increase even more in width of base than in prominence, this being the common tendency of the disease, it was thought right to remove the superior maxillary bone while yet the disease was limited to it. The patient died, ten days after the operation, with erysipelas. The specimen displays exactly the same disease as do those last described.

Now it sometimes happens that growths like these spontaneously perish, are separated with the ordinary phenomena of necrosis, and thus are naturally cured. Such an event was observed in a case under the care of Mr. Stanley.

A man, 37 years old, was admitted with a slight convex smooth prominence of the nasal process of his right superior maxillary bone, which he had observed increasing for two years, but which of late had not increased or given him any inconvenience. Indeed, he came to the hospital not for this, but for a swelling of the right gum and the mucous membrane of the hard palate, through fistulous openings in which one could feel exposed dead bone. These had existed for a month. The swelling of the upper process was so characteristic of the disease I am describing as to suggest at once the existence of such a growth; but the suppuration and necrosis threw obscurity on the case; and it was only watched and treated according to such indications as arose, till, after four months, the whole of the mass of bone with which the antrum had been filled up was separated and pulled away.

The appearance of the sequestrum, a

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* Mus. Coll. Surg. 3236, A.

† Museum of St. Bartholomew's Hospital, i. 62.

nearly spherical mass of hard, heavy, and finely cancellous bone, an inch or more in diameter, leaves no doubt of the nature of the disease.* The great cavity which remained, opening widely into both the mouth and the nose, gradually contracted, or was filled up, and the man recovered perfectly.

A similar event, I imagine, happened in a man who exhibited himself at most of the Hospitals in London, two years ago, with a great cavity where all his right upper jaw bone and his turbinated bones had once been, and through which one could see the movements of his pharynx and palate. This he said had been left after the separation of a great tumour of bone.

The growths of this kind seem to merge gradually into elevations of cancellous porous bone, which may be found on various parts of the bones of the skull, but of the exact pathology and relations of which we have, I believe, no knowledge. Here are specimens of them, and the Museum of St. Thomas's Hospital is as rich in them as that of the College. In some there are great thickenings of one or both tables of the skull, raising up bosses of new bone from half an inch to an inch in depth, on one or both the parietal bones, or on the occipital or frontal. In some, all the bones of the face are involved in similar changes. In some, similar elevations are produced by growth of bone between the tables, which themselves remain healthy. But, as yet, I believe we can only look at these as strange, inexplicable, and uninstructive things.

The last form of bony growths that I need mention, comprises the instances in which numerous exostoses occur in the same patient, and the examples of what has been called the ossific diathesis, or dyscrasia. In the large majority of cases, both cartilaginous and osseous tumours occur singly: a few exceptions might be found among such as I have been describing; but the rule is generally true. But in certain instances a large number of the bones bear outgrowths which, at least in external shape, are like tumours. These are commonly regarded as of constitutional origin; some indeed appear to be so in that sense of constitutional disease which implies a local manifestation of some morbid condition of the blood; but others can be called so only in that sense by which we intend some original and inborn error of the formative tendency in certain tissues or organs.

Of these last we may especially observe that the tendency to osseous overgrowths is often hereditary, and that its result is a symmetrical deformity. A boy, six years old, was in St. Bartholomew's Hospital, four years ago, who had symmetrical tumours on the lower ends of his radii, on his humeri, his scapulæ, his fifth and sixth ribs, his fibulæ, and internal malleoli. On each of these bones, on each side, he had one tumour: and the only deviations from symmetry were that he had an unmatched tumour on the ulnar side of the first phalanx of his right fore-finger, and that each of the tumours on the right side was rather larger than its fellow on the left.

I saw this child's father, a healthy labouring man, 40 years old, who had as many or even more tumours of the same kind as his son, but of which only a few were in the same positions. All these tumours had existed from his earliest childhood; they were symmetrically placed, and had ceased to grow when he attained his full stature, and since that time had undergone no apparent change. None of this man's direct ancestors, nor any other of his children, had similar growths, but four cousins, one female and three male, children of his mother's sisters, had as many of them as himself.

The swelling on the little boy's fore-finger was an inconvenience to him, and at his parents' request Mr. Lloyd removed the finger. It consisted of an outgrowth or projection of healthy-looking cancellous bone, full of medulla, and coated with a thin layer of compact tissue; its substance being regularly continuous with those of the phalanx itself.

Many similar cases of symmetrical and hereditary osseous outgrowths might, I believe, be adduced;* and all their history suggests that they are to be regarded as related not less closely to malformations, or monstrosities by excessive development, than to the osseous tumours or outgrowths of which I have been speaking. Indeed, at this point the pathology of tumours touches that of congenital excesses of development and growth.

We must distinguish from these cases the instances of multiple ossifications of tendons, muscles, and other tissues, that are occasionally met with; for these only imperfectly imitate the forms of tumours, and are probably connected with such a morbid condition of the blood as really may deserve the name of ossific dyscrasia or diathesis.

Before ending, it may be proper to point out the chief distinctions between the osseous tumours and those growths which are connected with other tumours springing from the bones; for, under the vague name of osteo-sarcoma, many include together, and seem to identify, all growths in which bone is mingled with a softer tissue. The growths that may chiefly need distinction are those of osteoid tumours, and the bony skeletons of certain medullary tumours of bone. Osteoid tumours are probably examples of ossified firm or hard, or fibrous; and the best marked among them present an abundant formation of peculiarly hard bone. The distinctions usually to be observed between these hard osteoid and the hard osseous tumours are mainly in these particulars:—(*a.*) the osteoid bone is in its mid-substance like chalk, the osseous like ivory, the one dull and powdery, the other bright and wholly void of friability; (*b.*) the osteoid is new bone infiltrated, as it were, in some softer tissue, or in the tissues of the original bone, which disappear as it increases; the hard osseous tumour is a distinct outgrowth, attached in a comparatively small part of its extent to the bone on which it grows; (*c.*) the outer surface of an osteoid growth is porous and rough, and, if laminated, its laminæ have their edges directed outwards; while the outer surface of a hard osseous tumour is smooth and compact, and if laminated, the surfaces of its laminæ are directed outwards; (*d.*) lastly, the minute characters of bone are far less perfect in the osteoid than in the osseous growth: bone corpuscles existing indeed, but small, round, irregular, with very small, if any, canaliculi, and imbedded in a porous, chalky-looking, basis substance.

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* The specimen is in the Museum of St. Bartholomew's Hospital.

* See Stanley, On Diseases of Bones, p. 152; and Mr. Hawkins's Lectures on Tumours of Bones, MEDICAL GAZETTE, vol. xxv. p. 474.

And, 2ndly, for distinction between the softer osteoid growths, (with which we may class the osseous skeletons of medullary cancers,) on the one hand, and the cancellous osseous tumours on the other, we may chiefly observe that, (*a.*) the osteoid tissue and the bone of cancers are more dry and friable than the cancellous bone of the tumours; and, (*b.*) the osteoid and the bone of cancerous growths have no medulla, the interspaces between their laminæ being filled with cancerous matter; while medulla is a constant constituent, I believe, of all the cancellous osseous tumours.

Such are the chief differences generally to be observed between the bone of innocent and that of malignant tumours; differences which it is well to establish, since the fact is sufficiently confusing, that any normal tissue should be formed in subordination to the growth of cancers.*

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* Some excellent observations on the subject of the conditions of the proper tissues of the body, when involved in cancers, have just been published by Mr. Humphry, in his Lectures on Surgery, in the Provincial Medical and Surgical Journal.

LECTURE VIII.

Glandular tumours.—Their occurrence in connection with the mammary, labial, thyroid, and prostate glands—Relation to the Proliferous cysts; from which, perhaps, they always originate—Mammary Glandular (Chronic Mammary) *tumours—Their usual seat and relations—chief varieties of apparent structure—microscopic characters — Capricious modes of growth—occasional disappearance—extents of growth—probable nature—Corresponding histories of the Labial and Prostatic Glandular tumours. Vascular or Erectile tumours.—Their frequent existence at birth — Principal varieties: arterial, venous, and capillary—the structure of each, as resembling, and differing from, erectile tissue—Their usual, and less frequent, seats—Relations to cystic and malignant tumours.*

We may call the tumours "glandular" that, in their structure, imitate the glands, whether the secreting glands, or those organs which we name glands, because, though having no open ducts, they are of analogous structure.

The most frequent example of these glandular tumours is the kind which imitates, and occurs in or near, the mammary gland; the chronic mammary tumour of Sir A. Cooper; the pancreatic tumour of Mr. Abernethy;* the fibrous tumour of the breast of M. Cruveilhier.† Other tumours of the same general kind are more rarely found in the lips, and in or near the prostate and the thyroid glands. Probably, too, some other tumours, to which no name, or a wrong one, has been hitherto assigned, may yet have to be placed in this group: indeed, I think it very probable that there are certain lymphatic gland-growths which we usually regard as enlarged glands, but which are really of the nature of tumours, even in the most limited sense of the term. At present, however, I will speak of only such gland-tumours as may be clearly recognized,—namely, the mammary glandular tumour, the labial, and the prostatic. I have already spoken of the thyroid, and of those which may imitate the parotid.

Some of the pathology of these tumours has been already sketched in the account of the glandular proliferous cysts.* To that account I may again refer, so far as to the point at which it is believed that an intra-cystic growth has completely filled the cyst in which its growth began, and has coalesced with the walls, so as to form a solid tumour.

Now, it is, perhaps, probable that all glandular tumours may be formed after this plan: for, in those occurring in the breast, we find sometimes one circumscribed mass composed half of a proliferous cyst, and half of a solid glandular tumour;† sometimes two such growths lie apart, yet in the same gland; and often, we find such structures as we doubt whether to call proliferous cysts nearly filled, or mammary tumours.

However, if all the mammary and other glandular tumours are thus of intra-cystic origin, it must be admitted that many of them must very early lose the cystic form, and continue to grow as solid masses; for we find them solid even when they are very small, and they are traced growing from year to year, yet apparently maintaining always the same texture.

I shall speak now of the solid tumours alone; and, first, of the Mammary Glandular tumours.

Sir Astley Cooper may be said to have had a good insight into their nature, when he called them "chronic mammary," and said they were "as if nature had formed an additonal portion of breast, composed of similar lobes."‡ But I believe nothing more than this general likeness had been observed, till these tumours were examined with the microscope by M. Lebert,§ who found in them the minute glandular structure imitative of the mammary gland, and recognized many of their relations to the proliferous cysts. Mr. Birkett,|| by independent and contemporary observations, made on the great collection of these tumours in Guy's Hospital, confirmed and extended the conclusions of M. Lebert, and has cleared up much of the obscurity that existed previous to his inquiries. Both these gentlemen apply such terms as

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* The mammary tumour described by Mr. Abernethy was probably a medullary cancerous disease.

† Anatomie Pathol., livr. xxvi. pl. 1; and Bulletin de l'Academie de Méd. t. ix. p. 429.

* Lectures i. and iii.

† Mus. Coll. Surg. 177-178.

‡ On Diseases of the Breast, p. 54.

§ Physiologie Pathologique. t. ii. p. 201.

|| On the Diseases of the Breast, p. 124.

"Imperfect Hypertrophy of the mammary gland" to these tumours: but highly as I esteem their observations (and not the less, I hope, because they corrected errors of my own*), I would rather not adopt their nomenclature, since if we do not call these "tumours," I hardly know to what innocent growths the term could be applied. Nearly all innocent growths are imperfect hypertrophies, in the same sense as these growths are; nay, these are, in many respects, the very types of the diseases to which the name of tumours is by general consent ascribed, and which can be distinguished, even in definition, from what are more commonly regarded as hypertrophies.

The mammary glandular tumours may be found in any part of the breast,—over, or beneath, or within the gland, or at its border. Their most rare seat is beneath the gland; their most common at its upper and inner part, imbedded in, or just beneath, its surface. They are usually loosely connected with the gland, except at their deepest part, where their capsules are generally fastened to the gland; but the connection is of so small extent that they slide very easily under the finger, and are peculiarly moveable in all directions.

The tumour is commonly of oval shape; superficially, or sometimes deeply, lobed or nodular; firm, or nearly hard, elastic, and often feeling like a cyst tensely filled with fluid. The parts around appear quite healthy. The mammary gland is pushed aside; but it undergoes no other change than that of atrophy, even when stretched over a tumour of the largest size. The skin under distension may grow slightly livid, but else is unchanged. The tumour is usually invested with a complete capsule, isolating it from the surrounding mammary gland, and often adhering less to it than to the gland. This capsule may appear only as a layer of fibro-cellular tissue, like that round any other innocent tumour; but it is not unfrequently more perfectly organized in layers, and smoother on its inner surface; conditions that we may perhaps ascribe to its having been a perfect cyst within which the glandular growth originated, and which it only lately filled.

On section, these tumours present a lobed construction, in which it is sometimes not difficult to discern the remains, or the imitation of the plan, of the lobed, and foliated and involuted intra-cystic growths. In some, the fibro-cellular partitions among the lobes converge towards the centre of the mass, as if they were the remains of clustered cyst-walls; or, there may remain a cavity in the centre of the tumour, as if clustered cysts and growths had not quite filled up the space. In some, however, no such plan is discernible; the whole mass is disorderly lobed, and its lobes have the shapes derived from accidental mutual pressure, and are bounded by loose fibro-cellular partitions.

In structure as in construction, these tumours may present several variations; but they may be artificially arranged in three or four chief groups.

Some are really very like the normal mammary gland in an inactive state. These have a pure opaque-white, and soft, but tough and elastic, tissue; they are lobed and minutely lobulated, with undulating white fibres. Such an one is well shown in a specimen from Sir Astley Cooper's collection,* in which, moreover, his injection of the blood-vessels shows a moderate vascularity, about equal to that of the surrounding normal gland substance.†

We might take such as this as examples of the medium form of this kind of tumour; and the other chief or extreme forms are represented by those which deviate from this in two directions. In one direction we find much softer tumours; these,‡ though closely textured, are soft, brittle, and easily crushed; their cut surfaces shine, or look vitreous or half translucent; they are uniformly greyish-white, or have a slight yellowish or pink hue, which deepens on exposure to the air; or they may look like masses of firm, but flickering, jelly; and commonly we can press from them a thin yellowish fluid, like serum or synovia. Such as these have the usual lobed and lobular plan of construction; and I think the intersecting partitions commonly extend from a firm, fibrous-looking central or deep part, towards the circumference of the tumour.

In the other direction from the assumed average or medium form, we find firmer tumours. These have a drier and tougher texture; they are opaque, milk-white, or yellowish, like masses of dense fibro-cellular tissue, lobed, and having their lobes easily separable, as in this great specimen§ of seven pounds weight.

To such as these varieties we might add many, due not merely to intermediate forms, but to the degrees in which the intra-cystic mode of growth is manifested; or to the development of cysts, which may take place as well in this new gland-tissue as in the old; or to the various contents of these cysts, whether liquids or organized growths.*

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* In the Catalogues of the Museums of the College and of St. Bartholomew's Hospital these tumours are classed with the fibro-cellular. In most of the specimens that I had examined the fibro-cellular tissue was very abundant, and I thought too lightly of the glandular tissue which I found mingled with it.

* Mus. Coll. Surg. No. 2772.

† In this specimen there is also a peculiar warty growth in the skin over the tumour.

‡ Such as No. 2774.

§ Mus. Coll. Surg. 208.

I believe we cannot at present always connect these various aspects of the tumours with any corresponding varieties in their histories. Neither, I think, have any investigations proved more of the corresponding varieties of microscopic structure, than that, as a general rule, but only a general one, the tougher any tumour is, the slower its growth has been, and the more it has of the fibro-cellular, mingled with its glandular, tissue; and that the more succulent and vitreous it is, the less perfectly is the glandular tissue developed, and the more rapid is the growth.

The microscopic structures may be best described from a medium specimen:† from such an one I made these illustrative sketches. The patient was thirty-three years old; the tumour had been noticed seven months, and was ascribed to a blow; it was painful at times and increasing; and it had the several characters that I have already described. The patient has remained well since its removal.

In such a tumour one finds, in thin sections, traces of a minute lobular or acinous form; the miniature, we might say, of that which we see with the naked eye. The lobules may be merely placed side by side, with little or no intervening tissue; their form may appear to depend on the arrangement of their contents, and these may seem scarcely bounded by membrane. But, I think, more commonly, especially in the firmer specimens, the plan of lobules or acini is mapped-out by partitions of filamentous-looking tissue, fasciculi of which, curving and variously combined, appear to arch over, and to bound, each acinus or lobule. Indeed, great varieties appear in the quantity of this tissue; it may be nearly absent, or it may so predominate as to obscure the traces of the essential glandular structure.

This proper gland-structure consists of minute nucleated cells and nuclei, clustered in the lobular form, or in that of cylinders or tubes, and often, or perhaps always in their most natural state, invested with a simple, pellucid, limitary membrane.

Thus, the likeness is striking between the structure of such a tumour and that of an inactive mammary gland, such as that of a male, as Mr. Birkett has pointed out. We have here what may be compared with the round or oval cæcal terminations of the gland-tubes clustered together, and often seeming grouped about one trunk-tube; and, in these we have the simple membrane and the gland-cells and nuclei within; only the main duct is wanting, and the communication with the ducts of the proper gland. It is as if the proper secreting structure of a gland were formed without connection with an excretory tube; the tumour is, in this respect, like one of the glands without ducts.

The mammary glandular tumours are singularly variable in all the particulars of their life. They sometimes grow quickly; as did the largest figured by Sir A. Cooper, which, in two years, acquired a weight of a pound and a half. In other cases their growth is very slow; here is one* that in four years had not become so much as an inch in diameter. In some instances they remain quite stationary, even for many years. Here is one† which was removed from a woman 27 years old: it was observed for 14 years, and in all that time it scarcely enlarged; yet after this it grew so rapidly that, after six months, it was thought imprudent to delay the removal. Cases of this arrest or extreme retardation of growth must have been seen by most surgeons; but there are few cases so striking as one related by M. Cruveilhier, in which a lady had, for more than 20 years, three of these tumours in one breast, and one in the other. She died of the treatment employed against them, and after death no similar disease was found in any other part.

Equal variations exist in regard to pain. Commonly these tumours are painless; but sometimes they are the seats and sources of intense suffering; even of all that suffering which is popularly ascribed to cancer, but which cancer in its early stages so very rarely presents. The irritable tumour of the breast, as Sir A. Cooper named it, was in most of his cases a mammary glandular tumour;‡ and the character of the pain, like that of the painful subcutaneous tumour, is such as we may name neuralgic.

I have here an example of a tumour§ evidently glandular, which was taken from the breast of a woman 25 years old, where it had been growing for two years, and had often been the seat of the most intense pain. I referred to a similar case in the fourth lecture, while speaking of neuralgic tumours; and quite lately I removed a similar tumour from the breast of a young lady, who begged for its removal only that she might be relieved from severe suffering. In all these cases the minute glandular structure was well marked.

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* I believe these include the chief examples of Müller's Cystosarcomata. One of these tumours containing simple cysts would constitute his cystosarcoma simplex: the cysts being proliferous with gland growths would make his cystosarcoma phyllodes.

† The microscopic examinations of several specimens may be found in Lebert (Phys. Patho. ii. 190, e.o.; and Abhandlungen, p. 269, e.o.); Birkett, On Diseases of the Breast, p. 16; and Bennett, On Cancerous and Cancroid Growths, p. 52.

* Museum St. Bartholomew, Ser. 34, No. 23.

† Mus. Coll. Surg., 207 B.

‡ Under the same name, however, he included some that were more probably "Painful subcutaneous Tubercles;" see his pl. viii. figs. 2, 4, 5, 7.

§ Mus. St. Bartholomew's Hospital, Ser. 34, No. 22.

A peculiarity of these tumours is, that they not unfrequently disappear; an event hardly paralleled in any other tumour. They are most likely to do this in cases in which any imperfection of the uterine or ovarian functions, in which they may have seemed to have their origin, is repaired by marriage, or pregnancy, or lactation. And the fact is very suggestive: since, in many cases, it appears as if the discontinuous hypertrophy, which constitutes the tumour, were remedied by the supervention of a continuous hypertrophy for the discharge of increased functions of the gland.

On the other side, these tumours often continue to grow indefinitely, and they may thus attain an enormous size. One was removed by Mr. Stanley seven years ago, which, after twelve years' progress, in a middle-aged woman, measured nearly twelve inches in length and weighed seven pounds. It was pendulous; and, as she sat, she used to rest it on her knee, till the integuments began to slough. Mr. Stanley merely sliced it off, cutting through the pedicle of skin; and the patient remains to this time well. The tumour is one of the firmest and most filamentous of the kind.[*]

Here also is a tumour[†] of the same kind, but softer, and much more succulent, which was removed by Mr. Liston from a woman 44 years old, and which weighed twelve pounds.

Respecting the origin of these tumours, little more, I believe, can be said than that, occurring most commonly in young unmarried or barren women, their beginning often seems connected with defective or disordered menstruation. The law which, if we may so speak, binds together in sympathy of nutrition the ovary and the mammary glands, the law according to which they concur in their development and action, is not broken by one with impunity to the other. The imperfect office of the ovary is apt to be associated with erroneous nutrition in the mammary gland.[‡]

There are, I believe, no facts to suggest that the glandular tumours are other than innocent. Several may grow in the same breast at the same or successive times; but I have not known of more than three either at once or in succession. In no case, I believe, has a malignant course been observed in such a tumour; nor am I aware of any facts which prove what is commonly believed, that, after a time, these tumours may become cancerous. Of course such things may happen; and, on the whole, one might expect, that if a woman have a tumour of this kind in her breast, cancer would be more apt to affect it as a morbid piece of gland, than to affect the healthy gland. But, I repeat, I know no facts to support this; and such as I have met with are against it. Thus, I have here a portion of breast[*] from a woman 42 years old, in which there lie, far apart, a small mammary glandular tumour that had existed four years, and a hard cancer that had existed four months.[†] And a second specimen[‡] shows a hard cancer and a proliferous cyst, in the breast of a patient, who died some time after its removal, with recurrence of the cancer. In these cases, at least, the tumour was not selected as the seat for cancer; and I believe that these cases are not counterbalanced by any of an opposite kind.

LABIAL GLANDULAR TUMOURS may be briefly described, for their general characters correspond closely with those of the foregoing kind; or, they may appear intermediate in character between the foregoing and those tumours which I described as lying over or near the parotid gland, and as consisting of mixed glandular and cartilaginous tissue. Their likeness to these tumours over the parotid was manifest to Mr. Lawrence, who has added to his account of the tumours by the parotid, the only case of labial glandular tumour that I have found on record.[§]

The most marked case of labial gland-tumour that I have seen was that of a healthy-looking man lately under the care of Mr. Lloyd. A tumour had been growing in his upper lip for 12 years. It was not painful, but the protrusion of the lip was inconvenient and ugly, the swelling being an inch in diameter. It was imbedded in the very substance of the lip, both the skin and mucous membrane being tensely stretched over it. Its form was nearly hemispherical, its posterior surface being flattened as it lay close on the gums and teeth, its anterior convex and smooth. Its whole substance was firm, tense, and elastic. Mr. Lloyd removed the tumour with the mucous membrane over it, leaving the skin entire. The tumour was firm, slightly lobed, yellowish-white, smooth. In general aspect it resembled the mixed tumours over the parotid, but in minute structure it presented as perfect an imitation of lobulated or acinous gland-structure, as any mammary glandular tumour I have yet seen. Its lobules and tubules were invested with distinct limitary membrane; and they were filled with nuclei and nucleated cells, like those of the labial glands.*

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[*] Mus. Coll. Surg., 208.

[†] Mus. Coll. Surg., 216.

[‡] Since the lectures were delivered, I have seen the only specimen with which I am acquainted, of a mammary glandular tumour in a male. A portion of it was sent to me by Mr. Sympson of Lincoln, and its characters were well marked. It was removed, by Mr. Hadwen, from a countryman, twenty-five years old, in whom it had been growing irregularly, and occasionally diminishing or disappearing, for about five years. When removed, it formed a circular, flattened, and slightly lobulated tumour, 3½ inches in diameter, and an inch in thickness, invested with a distinct fibro-cellular capsule, which loosely connected it to the adjacent tissues.

[*] Mus. St. Bartholomew's, Ser. 34, No. 17.

[†] Since the lectures were delivered, Mr. Stanley has removed a breast similarly diseased; a small hard cancer existing in one part, and a glandular tumour in another.

[‡] Mus. St. Bartholomew's Hospital, Ser. 34, 16,

[§] Medico-Chirurgical Transactions, Vol. xvii. p. 28.

In another case, I removed a similar tumour from the upper lip of a man about 30 years old. It had been regularly growing for four years without pain, and projected far externally, reaching to the same distance as the end of his nose. This had a texture of glandular kind, but less distinctly marked than that in the former case. Moreover, in the centre of the mass was a portion of bone; a peculiarity which existed also in Mr. Lawrence's case, and which may add to the probability of relationship between these tumours and the mixed glandular and cartilaginous tumours over the parotid.

Lastly, I may again refer to a specimen in the Museum of St. George's Hospital, in which, in one tumour, a cyst and what looks like one of these glandular growths are combined.

PROSTATIC GLANDULAR TUMOURS were briefly referred-to in the first lecture, as examples of the abnormal growths by which tumours appear to be connected with simple hypertrophies of organs; and I can add little to what was then said of them.

We owe to Rokitansky† the knowledge, that the tumours in the prostate gland, which were commonly, and till lately even by himself, regarded as fibrous tumours, are composed of tissues like those of the prostate gland. In enlarged prostates they are not unfrequently found. In cutting through the gland, one may see, amidst its generally lobed structure, portions which are invested and isolated by fibro-cellular tissue, and may be enucleated. Such portions have, I believe, been sometimes removed as tumours, or as portions of prostate-gland, in operations of lithotomy. They lie imbedded in the enlarged prostate, as sometimes mammary glandular tumours lie isolated in a generally enlarged breast. They look like the less fasciculate of the fibrous tumours of the uterus; but, to microscopic examination, they present such an imitation of the proper structure of the prostate itself, that we cannot distinguish the gland-cells or the smooth muscular fibres of the tumour from those of the adjacent portions of the gland. Only their several modes of arrangement may be distinctive.

At present the examinations of these tumours have been too few to furnish a complete history of them: neither can I add any cases or references to specimens to those which were adduced in the first lecture. Indeed, at present, the chief or nearly the whole interest of these tumours lies in those relations to general pathology to which I then referred: their surgical relations have at present, I believe, been scarcely studied.

The ERECTILE OR VASCULAR TUMOURS include most of the diseases which are described as vascular nævi, and of which the types are the subcutaneous nævi. Among them, also, are the growths to which John Bell gave the name of aneurism by anastomosis, and those which have been called Telangeiectasis.

The name "erectile tumour" has, of late years, come into general use, as expressing a principal fact concerning these diseases, namely, that many of them resemble very closely in their texture that of erectile or cavernous tissue. Mr. Humphry* has, indeed, rightly objected to the use of the term, that these tumours present no imitation of the erectile tissue in the power of filling themselves with blood, as if by some internal force. But, since this power of the true erectile tissue depends as much on the accessory structures of nerves and muscles as on the tissue itself, we may perhaps apply the term "erectile" to the tumours, remembering only for this, as for other structures occurring in tumours, that the imitation of the natural tissue is imperfect, or partial. However, if any be scrupulous in the use of these terms, we may call these tumours vascular, or cavernous, or even Telangeiectasis.

The likeness which these tumours bear to the erectile tissue, as exemplified in the corpus cavernosum penis, is sometimes, in general appearance, perfect. A well-marked specimen is in the Hunterian collection;* it was removed from under the lower jaw, and its cut surface displays a close network or sponge of fine, smooth, shining bands and cords, just like those of the corpus cavernosum penis, only less regular in their arrangement. The opportunities of examining such tumours in the recent state are very rare; they are usually spoiled by the operation for removing them; and I have not been so fortunate as to obtain a single good specimen fit for minute examination. But, what I have seen, and the descriptions which more fortunate watchers have recorded, leave little doubt that this imitation of erectile tissue is a frequent character of such tumours.

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* Another similar tumour has since been slowly growing in the same lip: a recurrence which, I have no doubt, is independent of malignancy.

† Ueber die Cyste, 1849; and, Anatomie des Kropfes.

* Lectures on Surgery, p. 111.

John Bell's account† of the aneurism by anastomosis, which is by far the most vivid and exact, in relation to the history of the disease, that has yet been published, accords with this statement. Although he had chiefly in view the arterial variety of these tumours, yet, of one he says,—"The substance of it was cellular, stringy, and exactly resembling the corpora cavernosa penis. … .the cells were filled with blood from the arteries, which entered the tumour in all directions." Another he compares to a sponge soaked in blood; and the descriptions of other examples, though less explicit, imply the same. The descriptions by Mr. Wardrop,‡ and Mr. Cæsar Hawkins,§ and the more minute accounts of structure by Mr. Goodsir,|| and Mr. Liston,¶ and Rokitansky,** confirm this view; and neither Mr.Birkett's,†† nor any other that I have met with, is discordant from it.

The essential structures of the disease are, according to these descriptions, derived from such a growth of blood-vessels, or rather of blood-spaces, that, in imitation of erectile tissue, the arteries are numerous but comparatively small, and, as we may believe, the capillaries or intermediate vessels open into veins so large, and so closely branching and anastomosing, that scarcely any continuity of tube can be discerned. Thus the whole mass seems formed of cells or spaces, opening widely into one another: and no remains exist of the walls of the veins, or of the tissue naturally lying between blood-vessels, except those narrow bands and cords that bound and intersect the cell-like spaces.‡‡

But while this form of tumour, in which the erectile tissue is imitated, may be taken as, in some sense, typical, we find, on either side of it, deviating forms. In some instances, the enlargement of arteries far exceeds that of veins; the swellings pulsate, and are florid and over-warm, and the tissues forming them may appear, for a time at least, hypertrophied. Some, I think, have described such arterial tumours as formed by the convolutions of a single artery, but they seem more commonly to be due to the dilatation of many anastomosing and closely clustered arteries. Such was the case in an instance recorded by Mr. Coote:* arteries of the lip, which, in their natural state, might not have had a greater diameter than a large pin, were dilated for about an inch of their course into sinuses or canals, and were equal in diameter to the adult radial artery. Similar to this was a very formidable case, lately cured by compression, under the care of Mr. Lloyd. The temporal, supraorbital, and occipital arteries, all exceedingly dilated and tortuous, converged to a large pulsating swelling over the sagittal suture.

On the other side are tumours formed mainly of overgrown, dilated, and sacculated veins. Arterial branches may, and I think usually do, pass into these; but some of these tumours seem wholly venous, as if all the dilatation of vessels were beyond the capillaries; and in these cases Rokitansky's expression is very applicable, that the circulation through the tumour may be compared with that through a portal vein.

Hence, speaking generally, it may perhaps be rightly stated, that among these vascular or erectile tumours, that which is common to all is an over-extension of blood-vessels or blood-spaces within a circumscribed space. We may assume that in different cases the change may chiefly affect either the arteries or the veins; or that it may affect both in such proportions as to produce an exact structural imitation of the erectile tissue Or, we may assume that, in all cases, the capillary blood-vessels are the chief seats of the dilatation: and that as they grow they may, according to the state of the circulation in them, and their relations to other blood-vessels, have the character of arterial or venous plexuses. This last interpretation is as consistent as the other with the observed appearances of the vascular tumours, and is more easily reconciled with a fact that may be occasionally observed; namely, that "a nævus,

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* Mus. Coll. Surg. 301 A.

† Principles of Surgery, vol. i. p. 456., e. s.

‡ Medico-Chir. Tran., vol. ix. p. 201, and pl. vi.

§ MEDICAL GAZETTE, vol. xxxvii. p. 1027.

|| Northern, J. of Medicine.

¶ Med. Chir. Trans., vol. xxvi. p. 125.

** Pathologische Anatomie, i. 276.

†† Med. Chir. Trans., vol. xxx.

‡‡ What tissue may remain between the blood-vessels depends on the seat of the nævus. The elements of the organs or tissue in which it has its seat will remain between its vessels, wasted or altered by compression or defective nutrition. They are seldom present in any distinct form; but a case is well described by C. O. Weber, in which abundant fibrous and fatty tissue occupied the space between the dilated vessels of an erectile tumour in a child's neck. Müller's Archiv, 1851, p. 74.

* MEDICAL GAZETTE.

which seems at first to consist only of arteries, after a time begins to exhibit veins under and around it, which veins may ultimately compose the larger part of the tumour."*

Whichever explanation we may adopt, the differences among these tumours naturally suggest that they should be called "arterial," or "venous," according to the character of vessels or of blood of which their mass consists. And a third intermediate form may pass by the name of "capillary," if it appear that the intermediate blood-vessels are the chief seat of dilatation and abnormal anastomosis.

Respecting the outer shape of the erectile tumours it is difficult to give a general account, since we can make only an artificial distinction between such as may bear this name, and those extended dilatations of cutaneous vessels which, with little or no swelling, form the cutaneous nævi, port-wine spots, and the like. These are evidently essentially the same diseases; the terms cutaneous and subcutaneous nævi, respectively applied to them, imply only their difference of seat; they have no real difference of nature, and are very often associated. But, if we include under the term erectile tumours only such as are for the most part or wholly subcutaneous, then it may be said that they are generally round or oval, disk-shaped, or spheroidal, but are often ill-defined, the morbid state of the blood-vessels in which they consist gradually merging into the healthy state of those beyond them. Sometimes, and especially in those of most venous character and of longest duration, the mass is circumscribed by fibro-cellular tissue, which forms a kind of capsule, and which is penetrated by the blood-vessels passing to and from the tumour.

To the touch, such tumours are usually soft, compressible, inelastic, feeling like a firm varicocele. Sometimes their bulk may be much diminished by pressure; and if they be cut into, a gush of blood takes place and they collapse, and then the blood may flow from them slowly, if it flow at all. In such cases as these the tumour is subject to variations, according to the state of the general circulation, or to those retardations of the venous streams of blood which ensue in expiration. Or, when such swellings are chiefly arterial, they may pulsate with the adjacent healthy arteries; and such as these are liable to what appear spontaneous enlargements: they may become, for instance, turgid during menstrual periods, or during mental excitement, and may bleed, at these times, if any part of their surface be ulcerated.

The connections of erectile tumours with adjacent parts are commonly close, even if they are not ill-defined: the number of vessels passing to and from them, and the condition of these vessels, which often differs only in degree from that of the vessels within them, make them always possess the character of continuous growths. In some cases, the dilatation affecting the vessels round an erectile tumour extends to only an inconsiderable distance from the tumour; the arteries enlarge only just before they enter it; the veins regain their calibre soon after they leave it: and hence the general safety with which John Bell and many others have cut out such tumours, when they attended to the rule he lays down with such emphatic repetition, that for such a tumour we are "not to cut into it, but to cut it out."

However, sometimes the limit of the disease is not so circumscribed; it gradually fades out; and, indeed, whether we trace the disease from the mass of the tumours into adjacent parts, or trace it in different specimens, it is not difficult to observe a regular gradation from the erectile tumour, through clusters of dilated and tortuous vessels, to that which we regard as merely the varicose condition of the veins or arteries. Such transitions are well shown in some of Cruveilhier's plates, and in a remarkable case by Dr. Hake and Mr. Image.*

We have comparatively few examinations of the forms of the blood-vessels within erectile tumours. The chief are those by Virchow,† who has observed that even the small vessels in them are unequally dilated and sacculated, just as those larger ones are that we can see externally to the chief mass of the disease. The same is observed by M. Robin,‡ who describes an erectile tumour in which, along the track of the vessels, numerous little culs-de-sac existed, which the blood might at will be made to enter and quit by alternately pressing and relaxing a piece of the tumour on the field of the microscope. They could be seen on vessels as small as $\frac{1}{5}$ of a millimetre in diameter; they were generally smaller at their connection with the vessels than at their other ends, and were commonly twice as long as the vessels were wide.

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* Warren's Observations on Tumours, p. 414. Rokitansky's view accords with neither of these assumptions; he regards all these tumours as new growths with preponderance of formation of blood-vessels by absorption of the solid blastema. But can this view be reconciled with the fact of dilatations, nearly imitating the erectile form, being found in well known arteries or veins near the erectile tissue? See, *e.g.* the case by Dr. Hake and Mr. Image, in the Med. Chir. Trans., 30; and many of those recorded by John Bell.

* Medico-Chirurgical Translations, vol. xxx.

† Archiv für Pathol. Anatomie, B. iii. p. 437.

‡ In Lebert, Physiologie pathologique T. ii. p. 99.

The cases of erectile tumour which in this description I have chiefly had in view, and which appear, indeed, to be most frequent, are those of the subcutaneous tissue. But they may be found with similar characters in many other parts, as *e. g.* in the muscles,[*] the bones,[†] and, according to Rokitansky, more frequently than anywhere else, in the liver.

These are the principal facts that I can cite respecting the structure of erectile tumours; and though they be very meagre and leave much for further enquiry, yet they may suggest some things worth consideration. Chiefly, they present the singular instance of the apparent primary growth of blood-vessels. In all other tumours, as in all anormal products, the formation of blood-vessels appears to be a consequent and subordinate process; as in the natural development of parts, so in what is morbid, organization to a certain point precedes vascularity, and the formation of blood-vessels follows-on that of the growths into which they pass. But here the case appears reversed: the calibre of the blood-vessels increases, and the solid tissues between them diminish; all the growth of an erectile tumour is an enlargement of blood-vessels, with diminution of the tissues in which they ramified; or, rather, it is often an enlargement not of blood-vessels but of blood-spaces: for though, in the first stages of the disease, the walls of the vessels may grow, thickening and elongating so that the vessels become tortuous, yet after a time the walls waste rather than grow; apertures seem to form through mutually apposed blood-vessels, and at length, while the blood within the tumour increases, the blood-vessels containing it diminish together with the parts in which they ramified. Hence, at last, in place of branching and anastomosing tubes there is only a network formed of the remains of their walls. This is therefore an increase of blood-spaces rather than of blood-vessels; so far as solid tissue is concerned, we might call it a wasting rather than a growth; no new materials seem to be added, but step by step the blood-vessels are dilated, and the intervening tissues clear away, leaving room for more and more blood.

Such a fact is, I think, at present quite inexplicable; and it constitutes a great difference between these and any other diseases named tumours.

But, leaving in this unfinished state the anatomy of erectile tumours, let me pass now to some of the facts concerning their life. We may notice, first, their frequent beginning before birth, and their especially quick growth in early childhood. Beyond all comparison they are the most common of congenital tumours. Hence, mother-spot is almost synonymous with nævus, and nævus with erectile tumour.

However, erectile tumours may begin, or may accelerate their growth, at any period of life. I have seen one of which no trace existed till the patient was twenty-five years old; and another in which rapid growth began for the first time when the patient was past fifty. Dr. Warren mentions a case of erectile pulsating tumour about the angles of the eyes and the forehead, which began in a girl seventeen years old. Many others, no doubt, have seen similar cases.

Their growth is uncertain; they may seem at rest for many weeks after birth, and then grow quickly, and then again may stay their growth.

Their maintenance of life, if I may so term it, is not strong. They are much more apt than the natural tissues are to slough or ulcerate after injury; and, in general disturbances of the health, they may perish altogether. I know of a case in which a large subcutaneous nævus in a child's forehead sloughed, while another on its back, of much less size, was in process of sloughing after the application of nitric acid. Similar apparently spontaneous sloughings have occurred during, or in the debility following, measles or scarlatina.

Their diseases are of much interest: especially two amongst them,—namely, the formation of cysts, and that of malignant structures in their substance.

I just referred to the formation of cysts in erectile tumours when speaking, in the second lecture, of serous cysts in the neck, and of sanguineous cysts. The history of the changes by which an erectile tumour becomes in part or wholly cystic is very incomplete; for the opportunities of observing them, except when they are accomplished, are very rare. The principal fact is, that next to the erectile tumours, those that are composed of clusters of serous or sanguineous cysts appear to be the most common congenital form, and that in some cases the two forms appear to have been present in one mass. I referred, in the second lecture, to such a case as recorded by Mr. Coote. Mr. Cæsar Hawkins,[*] also, had before described similar cases. He says of one, "you may see, in addition to the usual vessels, that several apparent cells exist. Some of these were filled with coagulum; their structure appeared identical with the other veins, of which they formed, as it were, aneurismal pouches. . . There were, however, besides these, some other cysts, which contained only serous fluid, and which were, to all appearance, close-shut sacs—serous cysts—their size being about that of peas."

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[*] See especially a case by Mr. Liston, l. c.; and one by Mr. Coote, l. c.; and Cruveilhier, livr. xxx. pl. 5.

[†] Among these may be included, probably, some of the cases described under the name of Aneurism of Bone and Osteo-Aneurism; as by Dr. Handisyde "Probationary Surgical Essay," Breschet, and others. But I am far from convinced that in all the cases thus entitled the blood-vessels of the bone were primarily or chiefly diseased. My impression is that, in many of them, the disease was really medullary cancer of the bone with excessive development of vessels, and that, in some, it was such a blood-cyst as appears to be sometimes formed in the course of a medullary disease.

In other instances, no erectile or nævous structure can be found, but the communication existing between one or more among a cluster of cysts and some large blood-vessel, makes it probable that they had the same origin. Thus, Mr. Coote traced a vein, as large as a radial vein, opening into the cavity of a cyst, which formed one of a large cluster removed by Mr. Lawrence from a boy's side. The mass formed by these cysts had existed from birth; some of them contained a serous fluid, others a more bloody fluid. In another similar cluster removed from a boy's groin, one cyst appeared to communicate with the femoral vein, or with the saphena at its junction with the femoral. In one case mentioned by Mr. Hawkins,[‡] when a cyst in the neck was opened, arterial blood gushed out. In another the patient died with repeated hæmorrhages from a cyst in the neck, and this cyst was found after death to be one of several, into some of which the blood-vessels of the isthmus of the thyroid glands opened.

It is difficult to interpret the formation of such cysts in nævi, or in connection with them or with veins. It may be that, as Mr. Hawkins believes, cysts are formed in these, as they may be in many other tumours, and that gradually, by the absorption produced by mutual pressure, they are opened into communication with one or more of the veins, or of the sacs connected with the veins. Or, as Mr. Coote suggests, it may be that certain of the dilatations of the vessels are gradually shut off from the stream of blood, so as to form shut sacs; and that after this their contained blood is absorbed and replaced by serous fluid.

Lastly, respecting the production of cancerous disease in the tissue of erectile tumours, it seems to be generally regarded as a frequent event, and these are commonly believed to afford the most frequent instances of malignant growths supervening on such as were previously innocent. I will not doubt that such events have happened. Especially, in one case recorded by Mr. Phillips,[*] the transition appears to have been very clearly traced. Yet, I think that in many of the cases which have gained for erectile tumous their ill-repute, a clearer examination would have proved that they were, from the beginning, very vascular medullary cancers, or else medullary cancers in which blood-cysts were abundantly formed.

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[*] Medico-Chirurgical Transactions, vol. xxii.; and Medical Gazette, vol. xxxvii. p. 1027.

[†] The specimen is in the Museum of St. Bartholomew's.

[‡] Clinical Lectures in the Medical Gazette, vol. xxviii., p. 483.

[*] On Vascular Tumours, in the Medical Gazette, vol. xii., 1833.

P.S.—The frequent confessions of ignorance and of imperfect knowledge contained in the foregoing pages may have suggested to readers, as to myself, that it would have been better not to publish these lectures. Yet, the necessity of such confessions may justify, in some measure, the publication, while much of the imperfection of our pathology of tumours is due to the rarity of the opportunities of studying some among them. Even in the field of a large hospital, one may pass years without an occasion for investigating certain of the points which it is most desirable to determine. In seven years I have been able to collect complete records of nearly three hundred cases of tumours, and to illustrate most of them with microscopic and other sketches. From such materials the statements I have ventured to make have been derived. But such materials are very insufficient. For example, as I have stated in the last lecture, I have had no good opportunity of examining an erectile tumour; of some others I have seen only one or two instances in the recent state; and some tumours, whose characters as described by good pathologists I cannot doubt, I have never yet seen.

A good end, therefore, may be served by the publication of the lectures, if I have only shown where our knowledge is most imperfect, and where it may be readily improved if others will engage in the necessary inquiries, or will supply with more ample materials those who are engaged in them. While wishing for such help I will not omit to thank many who have already given it; and especially my colleagues at Saint Bartholomew's, whose cases I have been allowed to study and to publish, with all the advantages of their assistance.

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